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Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
New York, 22 to 26 May 2006

Report submitted in accordance with paragraph 17 of General Assembly resolution 59/25, to assist the Review Conference to implement its mandate under paragraph 2, article 36 of the United Nations Fish Stocks Agreement

Report of the Secretary-General

Summary

The present report has been prepared in response to the request of the General Assembly to the Secretary-General, contained in paragraph 17 of its resolution 59/25, to present to the Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks a comprehensive report prepared in cooperation with the Food and Agriculture Organization of the United Nations (FAO). As provided for in paragraph 21 of Assembly resolution 60/31, the report takes into account the specific guidance elaborated by the fourth round of informal consultations of States parties to the Agreement. The report is based on information provided by States and regional fisheries management organizations and a contribution by FAO. It contains an overview of the status of straddling fish stocks and highly migratory fish stocks, of the status of discrete high seas fish stocks and of the possible impact that fishing the stocks concerned might have on other marine species. It also includes a review of the implementation of the Agreement in subregional and regional agreements or arrangements, as well as national legislation related to the implementation of the Agreement. The report further examines to what extent States parties, individually and through regional fisheries management organizations and other relevant multilateral mechanisms, take into account the special requirements of developing States in relation to the implementation of the Agreement and provide assistance to those States. Finally, the report examines issues that have prevented some States from becoming parties to the Agreement.

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Contents

		Paragraphs	*Page*
	Abbreviations		3
I.	Introduction	1–10	4
II.	Status of fish stocks and other marine species	11–134	6
	A. General considerations	12–21	6
	B. Highly migratory fish stocks	22–81	8
	C. Selected straddling fish stocks	82–103	18
	D. Other high seas fish stocks	104–116	23
	E. Associated species	117–134	26
III.	Review of the extent to which the Agreement has been incorporated into subregional or regional arrangements or arrangements to conserve and manage straddling fish stocks and highly migratory fish stocks, as well as national legislation related to the implementation of the Agreement, and of measures that have been adopted relevant to those stocks	135–291	30
	A. Conservation and management of stocks	137–216	30
	B. Mechanisms for international cooperation	217–266	46
	C. Monitoring, control and enforcement	267–291	57
IV.	Issues affecting implementation of the Agreement by developing States parties, taking into account Part VII of the Agreement	292–307	63
V.	Information on straddling fish stocks and highly migratory fish stocks for which no measures have yet been adopted	308–313	66
VI.	Issues that have prevented some States from becoming party to the Agreement	314–327	67
	A. Compatibility of conservation and management measures	317–323	68
	B. Subregional and regional cooperation in enforcement	324–327	70
VII.	Conclusions	328	71

Abbreviations

AIDPC	Agreement on the International Dolphin Conservation Programme
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EDF	European Development Fund
EEZ	Exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency
FIGIS	Fisheries Global Information System
GEF	Global Environment Facility
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GFCM	General Fisheries Commission for the Mediterranean
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tuna
ICES	International Council for the Exploration of the Sea
IOTC	Indian Ocean Tuna Commission
MARPOL	International Convention for the Prevention of Pollution from Ships
NAFO	North-west Atlantic Fisheries Organization
NEAFC	North-east Atlantic Fisheries Commission
OSPAR	Convention for the Protection of the Marine Environment of the North-east Atlantic
RFMO	Regional fisheries management organization
SEAFO	South-east Atlantic Fisheries Organization
SIDP	FAO Species Identification and Data Programme
SIOFA	South Indian Ocean Fisheries Agreement
SPC	Secretariat of the Pacific Community
SWIOFC	South-west Indian Ocean Fisheries Commission
VMS	Vessel Monitoring System
WCPFC	Western and Central Pacific Fisheries Commission

I. Introduction

1. The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (the Agreement)[1] is considered to be one of the most important legally binding multilateral instruments for the conservation and management of high seas fisheries since the conclusion of the United Nations Convention on the Law of the Sea (the Convention or UNCLOS) in 1982. Its objective is to ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks through effective implementation of the relevant provisions of the Convention. To that end, the Agreement establishes a clear set of rights and obligations for States to conserve and manage the two types of stocks and associated and dependent species as well as to protect biodiversity in the marine environment. Article 5 of the Agreement requires States to cooperate with other States directly or through appropriate RFMOs for the conservation and management of straddling fish stocks and highly migratory fish stocks, including cooperation for the establishment of new RFMOs where none exist in a particular region or subregion. States having a real interest in the fisheries concerned are encouraged by the Agreement to become members of such RFMOs. Article 8 (4) of the Agreement provides that only States that are members of an RFMO, or those that agree to apply the conservation and management measures established by such organizations or arrangements, shall have access to the fishery resources to which the measures apply.

2. The Agreement provides for a significant reinforcement of flag State duties concerning control over fishing vessels to ensure the effectiveness of international conservation and management measures. It also contains enhanced compliance control mechanisms, including (a) strengthened enforcement by flag States; (b) innovative non-flag State enforcement through subregional and regional cooperation; and (c) port State measures. Part VII of the Agreement recognizes the special requirements of developing States in the conservation and management of straddling fish stocks and highly migratory fish stocks. An Assistance Fund under Part VII was established by the General Assembly in 2003 to assist developing States parties in the implementation of the Agreement.

3. In addition, the Agreement provides for the mandatory recourse by States parties to the procedures for the peaceful settlement of disputes contained in the Convention. Article 30 of the Agreement stipulates that Part XV of the Convention applies mutatis mutandis to any dispute between States parties to the Agreement concerning the interpretation or application of the Agreement, or concerning the interpretation or application of a subregional, regional or global fisheries agreement relating to straddling fish stocks and highly migratory fish stocks to which they are parties, including any dispute concerning the conservation and management of such stocks, whether or not they are also parties to the Convention.

4. Although the Agreement is concerned with straddling fish stocks and highly migratory fish stocks, a number of its provisions, including provisions on application of the precautionary approach and an ecosystem approach to fishing activities, are applicable to the conservation and management of all marine capture fisheries, whether in areas under national jurisdiction or on the high seas, and are now often associated with "generally recommended international minimum standards" for the conservation of marine living resources, as referred to in articles

61 (3) and 119 (1) (a) of the Convention. Indeed, paragraph 12 of General Assembly resolution 60/31 seems to show that there is an emerging consensus among States according to which the general principles of the Agreement should also apply to discrete fish stocks on the high seas.

5. The Agreement entered into force on 11 December 2001. Article 36 provides that four years following the entry into force of the Agreement, the Secretary-General of the United Nations shall convene a conference with a view to assessing the effectiveness of the Agreement in securing the conservation and management of straddling fish stocks and highly migratory fish stocks. Article 36 (2) provides that the conference is to review and assess the adequacy of the provisions of the Agreement and, if necessary, propose means of strengthening the substance and methods of implementation of the provisions of the Agreement in order to better address any continuing problems in the conservation and management of the two types of stocks.

6. By paragraph 6 of its resolution 56/13, the General Assembly established the informal consultations of States parties to the Agreement for the purposes and objectives of, inter alia, considering the regional, subregional and global implementation of the Agreement and preparing for the review conference. Subsequently, the informal consultations of States parties have been convened annually by the Secretary-General, in accordance with resolutions 56/13, 57/143, 58/14, 59/25 and 60/31.

7. By paragraphs 16 and 17 of its resolution 59/25, the General Assembly requested the Secretary-General to convene, pursuant to article 36 of the Agreement, a one-week review conference in the first part of 2006, to render the necessary assistance and provide such services as may be required and to submit to the conference a comprehensive report prepared in cooperation with FAO. By paragraph 21 of its resolution 60/31, the Assembly took note of the report of the fourth informal consultations of States parties to the Agreement, which requested the Secretary-General to take into account the specific guidance proposed by the informal consultations regarding the comprehensive report. In compliance with that request, parts II and V of the present report are based on a submission by FAO.

8. Accordingly, a note verbale dated 21 June 2005 was circulated requesting information from States parties on measures they have adopted to implement the Agreement and from non-States parties on measures they have adopted that might reflect the principles in the Agreement. The latter were also requested to provide information about impediments that have prevented them from becoming parties to the Agreement.[2] In addition, RFMOs have been requested to provide information on how they have incorporated the relevant provisions of the Agreement into their conservation and management measures.

9. The present report also includes information obtained through the questionnaire circulated to States and RFMOs soliciting information for the preparation of the report of the Secretary-General on sustainable fisheries to be submitted to the General Assembly at its sixtieth session (A/60/189).

10. In preparing the present report, a number of other sources were used, in particular the websites of the relevant RFMOs, certain documents presented at the June 2005 meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea and other information and expertise available to

the Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs[3] of the Secretariat.

II. Status of fish stocks and other marine species

11. Section II of the report contains detailed information on the development of various tuna fisheries, including their current status, and on other highly migratory species, in particular the world shark population. FAO states that since the main species that constitute straddling fish stocks are generally well studied, its contribution to the present report does not include the biology, life history and migratory behaviour of those species. Such information is readily available from various published sources of information or from RFMOs. Section II also contains an overview of discrete high seas fish stocks and an evaluation of the possible impact of fishing for such stocks on other species.

A. General considerations

1. Species and stock terminology

12. For the purpose of the present review, "highly migratory species" are the species listed in annex I to the Convention. That is a legal definition rather than a scientific one, based on the actual migratory behaviour of the species. Nevertheless, the species listed in annex I are in general capable of migrating relatively long distances and stocks of those species are likely to occur both in exclusive economic zones and on the high seas.

13. The Convention does not use the term "straddling stocks", but article 63, paragraph 2, refers to "the same stock or stocks of associated species [that] occur both within the exclusive economic zone and in an area beyond and adjacent to the zone". That can be taken as a working definition of the concept of a straddling stock. The Agreement, while using the term extensively, does not define it. The concept of a straddling fish stock can cover a continuum from most of the fish being inside exclusive economic zones to most of the fish being outside such zones.

14. Neither the term "discrete high seas fish stocks" nor the concept behind it are used in part VII of the Convention, which addresses the living resources of the high seas in general. The term or concept does not appear in the Agreement, because it covers only stocks occurring both in the high seas and in exclusive economic zones. FAO has used the term "purely high seas stocks" for stocks that are not found within such zones. The present review uses the term "other high seas stocks" to refer to stocks that are not highly migratory or straddling. It is preferred to "discrete high seas stocks" because the discreteness of such stocks is generally unknown (for example, fish caught on distinct seamounts hundreds or thousands of kilometres apart do not necessarily belong to discrete separate biological units). The list of other high seas stocks used in the review is considered provisional, as new resources continue to come under exploitation.

15. Associated species are caught and/or impacted in fisheries for straddling fish stocks, highly migratory fish stocks and other high seas fish stocks. Any landed catch that is not from a straddling fish stock or highly migratory fish stock may be

regarded as being from other high seas fish stocks. It is considered that associated species are impacted species that are not part of the landed catch.

2. Approach, including data issues

16. The information in paragraphs 16 to 21 builds on a review of highly migratory fish stocks and straddling fish stocks prepared by FAO in 1994[4] as a contribution to the negotiations on the Agreement, and on the most recent review of the state of world fisheries published by FAO.[5] In some cases, the FAO review was updated based on information provided by RFMOs,[6] in particular by CCSBT, IATTC, ICCAT, IOTC, NEAFC, SPC and ICES. Catch information is from the FAO Fisheries Statistic Database.[7] The most recent complete year of data is 2003.

17. At present, there is no global inventory of fish stocks, although the FAO Committee on Fisheries called for one in the strategy for improving the information on the status and trends of capture fisheries, which was approved in February 2003.[8] FAO is developing FIGIS,[9] which will fulfil that need, but in 2005 had little stock information. The available FAO global fisheries statistics database is by country, species and statistical areas. Except for tunas, where catches by stocks are included in the database, those statistical areas are generally too large to correspond to stocks and the data available do not distinguish exclusive economic zone catches from catches on the high seas. Therefore, it has been necessary to make informed judgements for each FAO statistical area about which species are fished partially or entirely on the high seas.

18. Species/stocks were classified according to a scheme, used previously by FAO, as follows: underexploited (undeveloped or new fishery, believed to have a significant potential for expansion in total production); moderately exploited (exploited with a low fishing effort, believed to have limited potential for expansion in total production); fully exploited (the fishery is operating at or close to optimal yield/effort, with no expected room for further expansion); overexploited (the fishery is being exploited above the optimal yield/effort which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse); depleted (catches are well below historical optimal yields, irrespective of the amount of fishing effort exerted); recovering (catches are again increasing after having been depleted or after a collapse from a previous high); not known (not much information is available to make a judgement).

19. In its 2005 review of the state of world marine fishery resources, FAO reports on 584 species (or species group)-statistical area combinations, for which the state of 441 (76 per cent) is reported known.[5] While they are referred to as stocks, in many cases they are a collection of several stocks from either a management or biological perspective. For example, cod in the north-west Atlantic is reported on as a single entry although there are 10 separate management units for cod fisheries in the area. There is probably more than one reproductively isolated breeding population (that is, stocks from a biological perspective) in some of those management units. In spite of those limitations, the state of stocks reported in the above-mentioned review was used herein as the best available global source of stock status information, with refinements based on more recent information provided by RFMOs or on the fishery-specific knowledge of FAO staff or its consultants.

20. Information on species associated with fisheries for highly migratory species, straddling fish stocks and other high seas fish stocks is very limited. Catches of

those species are rarely reported; most are discarded at sea. Some States collect data on discards but the information is incomplete and not routinely reported to FAO. However, FAO recently published an update of information on fishery discards, which provides useful information on associated species.[10] The status of some species is known from various sources (for example, some sea turtle populations are in danger of extinction), while almost nothing is known about others. Thus, the present review highlights known and potential issues concerning associated species, but a comprehensive assessment is not possible.

21. Various FAO information resources were used as sources of information on the biological characteristics and geographical distribution of the species, including the FAO species catalogues and other information products provided by SIDP,[11] FIGIS species fact sheets[12] and Fishbase.[13]

B. Highly migratory fish stocks

22. As indicated above, highly migratory species are legally defined as those listed in annex I to the Convention. They include tuna and tuna-like species, oceanic sharks, pomfrets, sauries and dolphinfish. Some of those species may only occur and/or be caught within exclusive economic zones, but the available global database does not distinguish between catches on the high seas and those within such zones. Highly migratory species are therefore discussed without regard to stocks or occurrence within exclusive economic zones or on the high seas.

1. Tuna and tuna-like species

23. The information presented in the section below is based primarily on the 2005 review by FAO[5] and on the FAO project on "Management of tuna fishing capacity: conservation and socio-economics".[14] Information has also been obtained from RFMOs, either directly from their websites and publications, or through submissions they have made to FAO specifically for the present report

(a) Resources

24. All tuna and tuna-like highly migratory species (billfishes, bonitos, mackerels and tunas) belong to the suborder Scombroidei. The tunas (*Thunnini*) include the most economically important species referred to as principal market tunas because of their global economic importance and their large-scale international trade for canning and sashimi. Tunas are subclassified into four genera (*Thunnus, Katsuwonus, Euthynnus and Auxis*), with 14 species altogether.

25. The tunas included in annex I to the Convention are: albacore tuna (*Thunnus alalunga*), which occurs in tropical and temperate waters; bluefin tuna[15] (*Thunnus thynnus*), mostly found in temperate waters of the Atlantic Ocean, including the Mediterranean Sea and the Pacific Ocean; bigeye tuna (*Thunnus obesus*), found in the Atlantic, Indian and Pacific Oceans; skipjack tuna (*Katsuwonus pelamis*), with a worldwide distribution in tropical and temperate waters; yellowfin tuna (*Thunnus albacares*), also with a worldwide distribution in tropical and subtropical more temperate seas; blackfin tuna (*Thunnus atlanticus*), found in the west Atlantic in tropical and warm seas; little tunny (*Euthynnus alletteratus*),[16] found in tropical and subtropical waters of the Atlantic and the Mediterranean, the Black Sea, the Caribbean Sea and the Gulf of Mexico, and Kawakawa (*Euthynnus affinis*) found in

the Indian and Pacific Oceans; southern bluefin tuna (*Thunnus maccoyii*), found in temperate waters of the southern hemisphere in the Atlantic, Indian and Pacific Oceans; and frigate mackerel tuna (*Auxis thazard and A. rochei*)[17] found in the Atlantic (*Auxis thazard* does not occur in the Mediterranean Sea), Indian and Pacific Oceans.

26. Tuna species can be loosely categorized into tropical and temperate tunas. They exhibit a wide range of life histories, ranging from the skipjack tuna, which has a short lifespan, high fecundity and wide distribution in tropical and temperate waters, to the bluefin tuna, which is long-lived, breeds late and has well-defined breeding and migration patterns. Differing life histories result in contrasts in vulnerability to overfishing. Skipjack are generally considered to be more resilient to exploitation, while the bluefin tuna are considered more vulnerable, all the more so because of their extremely high market value. The other species have life history characteristics that are intermediate between those two extremes.

27. The tuna-like species included in annex I to the Convention also have an extensive distribution. They are: marlins,[18] of which there are nine species (*Tetrapturus angustirostris, T. belone, T. pfluegeri, T. albidus, T. audax, T. georgei, Makaira mazara, M. indica* and *M. nigricans*), with one or more species found in every ocean; sailfishes, with two species, *Istiophorus platypterus*, formerly restricted to the Indian and Pacific Oceans but now found in the Mediterranean Sea where it entered via the Suez Canal, and *I. albicans*, found in the Atlantic Ocean and migrating in the Mediterranean Sea; and swordfish (*Xiphias gladius*), found in the Atlantic, Indian and Pacific Oceans, the Mediterranean Sea, the Sea of Marmara, the Black Sea and the Sea of Azov.

28. Little tunny (*E. alletteratus*) and kawakawa (*E. affinis*), and to some extent, blackfin tuna (*T. atlanticus*), black skipjack (*E. lineatus*), bullet tuna (*A. rochei*) and frigate tuna (*A. thazard*), are less oceanic and more associated with the continental shelves than the other tunas and tuna-like species in annex I to the Convention.

29. The longtail tuna (*T. tonggol*) is an important tuna, not included in annex I to the Convention, which has a wide but less oceanic distribution associated with the continental shelves. Other important tuna-like species not in annex I to the Convention include slender tuna (*Allothunnus fallai*), butterfly kingfish (*Gasterochisma melampus*), wahoo (*Acanthocybium solandri*), bonitos (*Cybiosarda, Orcynopsis and Sarda*) and species of the genus *Scomberomorus* (Spanish mackerel, king mackerels, seerfish and sierra). Slender tuna and butterfly kingfish (with a circumpolar distribution in the Southern Ocean) are now caught mostly as by-catch in the longline fishery targeting southern bluefin tuna.

(b) Fisheries

30. Until the second part of the twentieth century, fishing occurred mostly in coastal areas. As a result of increasing demand for tuna for canning, industrial fisheries began during the 1940s and 1950s. During the 1950s, the major industrial fisheries were the Japanese longline fishery and the pole-and-line fisheries of Japan* and the United States, operating in the Pacific. The longline fishery reached the Atlantic during the late 1950s. In addition, some European pole-and-line vessels, based in local ports, began fishing off the west coast of Africa at that time.

31. During the 1960s, European pole-and-line and purse-seine vessels began fishing for tunas off tropical West Africa. The Japanese fleet of pole-and-line vessels increased and expanded their area of operation in the west and central Pacific. Japanese longliners also expanded their fishing operations all over the world, targeting mostly albacore tuna and yellowfin tuna for canning. During the mid-1960s, vessels of Taiwan Province of China* and the Republic of Korea* became involved in large-scale longline fishing for tunas. At the end of the decade, improvements in freezing technology and cold storage systems developed for Japanese longliners made it possible to produce fish acceptable for the sashimi market which, in turn, led the vessels to shift their target species from yellowfin and albacore tuna for canning to bluefin and bigeye tuna for sashimi. In the east Pacific, the pole-and-line vessels of the United States were almost completely replaced by purse-seine vessels. Quotas for yellowfin tuna in that region were first established in 1966.

32. During the 1970s the purse-seine fishery by vessels from European States in the tropical east Atlantic developed quickly while the United States purse-seine fishery of the tropical east Pacific expanded offshore. A purse-seine fishery for tunas began in the west Indian Ocean during the 1980s, when vessels from European States, which had fished in the Atlantic moved to that region. In the Pacific, the purse-seine fishery further expanded its fishing area, particularly in the west and central Pacific. In the Atlantic, countries such as Brazil and Venezuela (Bolivarian Republic of)* entered the purse-seine fisheries.

33. Purse-seiners began fishing with artificial fish-aggregating devices in the Atlantic early in the 1990s, and the method quickly spread to the Indian and Pacific Oceans. Management efforts during the 1990s intensified and are continuing in response to stock concerns and increasing focus on illegal, unreported and unregulated fishing. The catch by small-scale coastal longline fisheries increased greatly during the 1990s. Another important event was the development of bluefin tuna farming which can increase fishing pressure.

34. Tuna are fished, traded, processed and consumed globally. Industrial fleets often transfer their operations from one ocean to another in response to changing conditions in fish availability, markets and/or fishing regulations, and the fish caught are frequently transported to other parts of the world for processing. In addition, substantial illegal, unreported and unregulated fishing, which occurs in all oceans in spite of recent efforts to control it, complicates the management of tuna fisheries.

35. In 2003, tuna and tuna-like species classified as highly migratory in annex I to the Convention accounted for 5 million tons, nearly 80 per cent of the total reported catches of all tunas and tuna-like species. Two species, skipjack and yellowfin tuna, accounted for more than 50 per cent of the catch (3.6 million tons) in that year, and a substantial portion is caught within exclusive economic zones.

(c) State of the stocks

36. The section below classifies the state of exploitation of tuna and tuna-like species according to the FAO classification scheme described above. Most highly migratory tropical tunas have very high fecundity, wide geographic distribution, opportunistic behaviour and other characteristics that make them highly productive and resilient to exploitation. With proper management, they are capable of

sustaining high yields, but possibilities of overexploitation and stock depletion nevertheless exist if fishery management is not adequate. Highly migratory temperate tunas have life history characteristics that make them much more sensitive to exploitation. As a result, expected yields are lower and the risks of overexploitation are higher, making it all the more important to exercise prudent management.

37. Bluefin tuna, a temperate species, is depleted in the west Atlantic, as is southern bluefin tuna, and it is overexploited in the east Atlantic. The Pacific bluefin tuna is fully exploited.

38. Albacore, another temperate species, is fully exploited in the south Atlantic and in the north and south Pacific and overexploited in the north Atlantic. Albacore is probably moderately exploited in the Indian Ocean, while the state of exploitation in the Mediterranean Sea is unknown.

39. Although bigeye tuna is tropical and has a life span shorter than bluefin tuna, there is increasing concern that its exploitation may be too high. In addition to being overexploited, there is concern that increasing purse-seine catches of small bigeye associated with artificial fish-aggregating devices may negatively affect the longline catches of large bigeye, which have a much higher price. Bigeye tuna is overexploited in the east Pacific and is probably fully exploited elsewhere.

40. The yellowfin tuna stocks are close to or are being fully exploited in all oceans, while skipjack tuna is only moderately exploited in the Pacific and probably also in the Indian Ocean. However, with the present fishing technique, catches of skipjack cannot be increased without undesired increases of catches of other species. The state of skipjack is uncertain in the Atlantic.

41. The state of exploitation of many other tuna and tuna-like species is highly uncertain or unknown. Significant uncertainties in the state of exploitation of many billfishes represent a serious conservation problem. In the Atlantic, blue and white marlins seem to be overexploited even though they are not generally targeted. Blue marlin is fully exploited in the east Pacific, but striped marlin is only moderately exploited. Because of commercial exploitation, there is more known about the state of the exploitation of swordfish than that of other billfishes. In the Atlantic and the south-east Pacific swordfish are fully exploited and there is concern about the effect of recent increases in fishing effort in the south Pacific. In the north-east Pacific, swordfish is only moderately exploited. There is also intensification of fisheries targeting swordfish in the Indian Ocean.

42. In summary, the scientific information available from RFMOs and intergovernmental organizations indicates that most stocks of tuna are fully exploited, some are overfished and a few are depleted. There are probably few opportunities to increase exploitation, except in some areas of the Pacific, and possibly in the Indian Ocean, where significant increases in catches of skipjack tuna might be sustainable. However, if current fishing techniques are used, that can only be done at the expense of undesired increases of catches of other species.

2. Oceanic sharks

43. The heading above covers those sharks listed in annex I to the Convention: bluntnose sixgill sharks (*Hexanchus griseus*), basking sharks (*Cetorhinus maximus*); thresher sharks (family Alopiidae); whale sharks (*Rhincodon typus*); requiem sharks

(family Carcharhinidae); hammerhead, bonnethead or scoophead sharks (family Sphyrnidae); and the mackerel sharks (family Lamnidae)[19].

44. Information on the biological characteristics and geographical distribution of oceanic sharks is found in an FAO report[20] prepared in support of the International Plan of Action for Conservation and Management of Sharks,[21] FAO catalogues,[22,23] other FAO sources[24] and Fishbase.

45. Owing to the nature of the available information, the description of the resource, the fisheries and the state of exploitation are covered species by species. Unfortunately, the state of many shark populations is unknown, or poorly known. However, the life history of sharks, for example slow growth, long lifespan and low fecundity, makes them particularly vulnerable to overexploitation and depletion. The total of reported catches of species and families of sharks listed in annex I to the Convention was close to 100,000 tons in 2003. Requiem sharks account for 90 per cent of those catches.

(a) Bluntnose sixgill sharks

46. The bluntnose sixgill shark (*Hexanchus griseus*) has an almost circumglobal distribution in tropical and temperate seas on the continental and insular shelves and upper slopes at depths from surface to at least 1,875 m, but it is mostly a deep water shark. It is locally common and taken by line, gear, gill nets, traps and pelagic and bottom trawls. There are no assessments of the state of the stock(s) or exploitation. Catches have been reported only from the Atlantic since 2001.

(b) Basking sharks

47. The basking shark (*Cetorhinus maximus*) is a coastal pelagic shark found in boreal to warm temperate waters of the continental and insular shelves, occurring from well offshore to near shore. It occurs in all regions except Antarctica and the Arctic. Basking sharks undertake long-distance migrations.

48. The basking shark has been the target of harpoon fishing from small boats, but it has also been taken in nets, including bottom gill nets and occasionally bottom and pelagic trawls. The species is also harmed by other gears. Several localized basking shark fisheries have shown sharp declines, but it is difficult to separate natural fluctuations in local abundance from the effects of exploitation globally.

49. The basking shark is likely to be extremely vulnerable to overexploitation, perhaps more so than most sharks, because of its slow growth rate, advanced age of maturity, long gestation period, low fecundity and probably small size of existing populations. Reported catches in excess of 8,000 tons were common during the years from 1960 to 1980, but have been much smaller since the end of the 1990s. The species is probably overexploited globally with some areas being depleted. The basking shark is listed in the "endangered or threatened species" list which appears in annex II to the Protocol to the Barcelona Convention for the protection of the Mediterranean Sea, and in appendix II to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

(c) Thresher sharks (family Alopiidae)

50. There are three species of thresher sharks: *Alopias pelagicus*, *Alopias superciliosus* and *Alopias vulpinus*. All three species are believed to occur in

temperate and tropical waters of all oceans. Given their life history characteristics, the species are not expected to have a high resilience to exploitation, but stock status remains uncertain. It is prudent to consider them as being fully exploited or overexploited globally.

51. *Alopias pelagicus* was formerly exploited by longline fisheries in the north-west Indian Ocean, but it is also fished in the central Pacific. *Alopias superciliosus*, commonly known as the bigeye thresher shark, has been caught in the oceanic longline fisheries operating in the north-west Indian Ocean, west and central Pacific, north-east Pacific and in the north Atlantic. The species is also taken as incidental by-catch in fixed bottom and pelagic gill nets and in trawls. *Alopias vulpinus* is frequently caught by offshore longline and pelagic gill net fisheries. It is also fished with anchored bottom and surface gill nets and it is a by-catch of other gear, including bottom trawls and fish traps. The species became the object of an important targeted pelagic gill net fishery off the west coast of the United States in the late 1970s, with a peak reported catch of 1,000 tons in 1982, declining because of overfishing to less than 300 tons by the late 1980s. The targeted fishery was ended by 1990, but the species is still caught as by-catch of the swordfish gill net fishery and may be sold for higher prices in the market than swordfish.

(d) Whale shark (*Rhincodon typus*)

52. The whale shark has a circumglobal distribution in tropical and warm temperate seas. It is an epipelagic oceanic and coastal pelagic species ranging from far offshore to close inshore, sometimes entering lagoons of coral atolls. Whale sharks migrate long distances, with their movements probably timed to coincide with plankton blooms and changes in water temperatures. They are often associated with schools of pelagic fish, especially scombrids. Whale sharks have been fished sporadically by some countries around the Indian and west Pacific Oceans[25] but no catches are recorded in the FAO fisheries statistics database.

53. Given its life history characteristics, the whale shark is expected to have low resilience to exploitation, but the state of stocks remains uncertain in most areas. It is prudent to consider the species as being fully exploited globally. The whale shark is listed in both appendix II to CITES and the "endangered or threatened species" list which appears in annex II to the Protocol of the Barcelona Convention.

(e) Requiem sharks (family Carcharhinidae)

54. Requiem sharks have a worldwide distribution in tropical and temperate waters. There are 50 species in the family (30 in genus *Carcharhinus*) which is, by far, the most important shark family for fisheries in the tropics. The main species from a fisheries point of view are: *Carcharhinus falciformis*, *Carcharhinus signatus*, *Carcharhinus longimanus* and *Prionace glauca*.

55. The silky shark (*Carcharhinus falciformis*) has an oceanic and coastal, circumtropical distribution and is most common offshore. It is an oceanic, epipelagic and littoral, tropical shark, found near the edge of continental and insular shelves, as well as far from land in the open sea. Its population dynamics and stock structure are poorly known. The silky shark is one of the three most common oceanic sharks, along with the blue shark (*Prionace glauca*) and oceanic whitetip shark (*Carcharhinus longimanus*), and one of the most abundant large marine organisms. It is often taken by pelagic longline fisheries and occasionally by fixed

bottom nets. The state of exploitation is unknown. Its wide distribution and high abundance in most tropical shelves suggests that presently there are no major concerns over the conservation of the species globally. In 2003, slightly more than 5,000 tons were recorded, but past catches have been considerably higher.

56. The whitetip shark (*Carcharhinus longimanus*) is an oceanic shark found in tropical and warm-temperate waters of the Atlantic, possibly in the Mediterranean Sea, in the west Indian Ocean and in the Pacific. It is usually found far offshore, but it sometimes occurs in shallow waters inshore, particularly off oceanic islands or in continental areas where the shelf is very narrow. It is normally caught with pelagic longlines but also with handlines and occasionally pelagic and even bottom trawls.

57. The blue shark (*Prionace glauca*) has a worldwide distribution in temperate and tropical oceanic waters. It is one of the most abundant and the most heavily fished sharks in the world, often as by-catch in pelagic longline fisheries, but also on hooks and lines, in pelagic trawls and even bottom trawls near the coasts. In 2003, more than 30,000 tons were recorded.

58. Catches of requiem sharks reported to FAO were less than 10,000 tons in the 1950s, increasing to 40,000-50,000 tons in the 1960s and 1970s. After a brief decline in the early 1980s, reported catches increased more or less steadily to more than 80,000 tons in 2003. Catches are reported from the Atlantic, Indian and Pacific Oceans with blue sharks, spot-tail sharks (*Carcharhinus sorrah*, a coastal non-oceanic species) and silky sharks being the most important species.

(f) Hammerhead, bonnethead or scoophead sharks (family Sphyrnidae)

59. The family Sphyrnidae comprises nine species: the winghead (*Eusphyra blochii*); the scalloped bonnethead (*Sphyrna corona*); the whitefin hammerhead (*Sphyrna couardi*); the scalloped hammerhead (*Sphyrna lewini*); the scoophead (*Sphyrna media*); the great hammerhead (*Sphyrna mokarran*); the bonnethead (*Sphyrna tiburo*); the smalleye hammerhead (*Sphyrna tudes*); and the smooth hammerhead (*Sphyrna zygaena*). The family is considered coastal, occasionally occurring in brackish water, with a global distribution mostly in warm waters. Since 1991, only catches of Sphyrnidae from the Atlantic have been reported. The catch was less than 2,000 tons in 2003.

60. Although all species are caught, only the smooth hammerhead and the scalloped hammerhead are reported as individual species in the FAO statistics. The smooth hammerhead (*Sphyrna zygaena*) was believed to be an amphitemperate species (that is, one that occurs in temperate water in the northern and southern hemispheres and is absent from the tropics), but it is now known to occur in the tropics. It has a circumglobal distribution. It is an active, common, coastal pelagic and semi-oceanic species, caught with pelagic longlines, handlines and bottom and pelagic trawls.

61. The scalloped hammerhead (*Sphyrna lewini*) has essentially a circumglobal distribution in coastal and semi-oceanic warm temperate and tropical seas. It occurs over continental and insular shelves and in deep water adjacent to them, often approaching close inshore and entering enclosed bays and estuaries. It is probably the most abundant hammerhead. The species is apparently highly mobile and in part migratory, forming huge schools of small migrating individuals. Owing to its abundance, the species is common in inshore artisanal and small commercial

fisheries, as well as offshore operations. It is caught with pelagic longlines, fixed bottom longlines, fixed bottom nets and even bottom and pelagic trawls. Given its life history characteristics, the scalloped hammerhead shark is expected to have very low resilience to exploitation. Although its worldwide distribution and known high abundance give the species some protection globally, the risk of local depletion remains a serious concern.

(g) Mackerel sharks

62. Mackerel sharks have a worldwide distribution in temperate and tropical seas. There are five species in the Lamnidae family: the great white shark (*Carcharodon carcharias*), the shortfin mako (*Isurus oxyrinchus*), the longfin mako (*Isurus paucus*), the salmon shark (*Lamna ditropis*) and the porbeagle (*Lamna nasus*). Reported catches of Lamnidae have increased steadily from about 1,000 tons in the early 1980s to almost 7,000 tons in 2003, mostly short-fin mako (5,000 tons) and porbeagle (1,000 tons).

63. The great white shark (*Carcharodon carcharias*) is mostly amphitemperate and found in coastal and offshore areas of continental and insular shelves. The great white shark is of little interest to commercial fisheries, but its sensitivity to harvest led to its listing in appendix II to CITES in 2004. It is also listed in the "endangered or threatened species" list which appears in annex II to the Protocol of the Barcelona Convention.

64. The short-fin mako (*Isurus oxyrinchus*) is a coastal and oceanic circumglobal species found in temperate and tropical waters. It is important for longline fisheries because of its high quality meat. It is also a prime game fish prized by sport anglers. Given its life history characteristics, the short-fin mako is expected to have medium resilience to exploitation (relative to other sharks). Its worldwide distribution and relatively high abundance in some areas probably means it is not currently at risk, but it can be easily overfished and localized depletion is always a risk. ICCAT cannot rule out the biomass in the north Atlantic being below that required to produce maximum sustainable yield, but in the south Atlantic it is probably above that level.[26]

65. The long-fin mako (*Isurus paucus*) is an oceanic, warm water, epipelagic species, probably circumtropical, but records are sporadic with the result that the distribution is poorly known. The species is probably often mistaken for the apparently far more common short-fin mako shark or included with records for it. It was apparently common in the west Atlantic and possibly in the central Pacific, but rare elsewhere. It is probably taken regularly in tropical pelagic longline fisheries for tuna and swordfish as by-catch. In addition to longlines, the species is taken with hooks and lines and with anchored gill nets. Little is known about the state of long-fin mako shark populations.

66. The salmon shark (*Lamna ditropis*) is a common coastal littoral, offshore and epipelagic shark, found in cool waters of the north Pacific. Salmon sharks are common in continental offshore waters but range inshore to just off beaches; they also are abundant far from land in the north Pacific basin. The species has been fished in the north Pacific in the past by longlines and gill nets. It is also caught in salmon seines, by salmon trollers towing hooks and possibly by bottom trawlers off Alaska. It is considered heavily fished even though most of the catch is discarded as by-catch. Despite its abundance, knowledge of its biology is limited but its

fecundity is very low and the species probably cannot sustain current fishing pressure for extended periods.

67. The porbeagle (*Lamna nasus*) is a coastal and oceanic, amphitemperate species, with centres of distribution in the north Atlantic and in a circumglobal band of temperate water of the south Atlantic, south Indian, south Pacific and Southern Oceans. It is most abundant on the continental offshore fishing banks, but is also found far from land in ocean basins and occasionally close inshore. The porbeagle usually occurs in cold water, less than 18° C and down to 1° C. Catches in Europe indicate that the porbeagle segregates by size (age) and gender. Porbeagles breed on both sides of the north Atlantic. Porbeagles of the north-west Atlantic seem to constitute a single stock that undertakes extensive migrations. Long-term tagging data suggest there is no mixing between that population and the stock of the north-east Atlantic. The species has been heavily fished commercially and utilized for human consumption in the temperate north Atlantic and the Mediterranean Sea, but is also caught as by-catch in the southern hemisphere.

68. Stocks in the north Atlantic have shown signs of serious overexploitation as indicated by a large decline in catch. The west Atlantic stock is currently considered overexploited. For the north-east Atlantic, ICES concluded in 2005 that the stock is depleted and no fishery should be permitted.[27] Porbeagle is an important by-catch of longline fishery and probably of the pelagic fishing fleets in the south Indian Ocean and elsewhere in the southern hemisphere. The catch is poorly known and is probably little utilized except for fins.

(h) Fisheries

69. Sharks are long-lived and slow-growing, and produce few offspring.[28] Consequently the production of recruits is closely linked to the spawning stock of adults. Stock recovery should be expected to be slow if overexploitation causes depletion. The number of shark species is small compared with the number of species of bony fishes, but they occupy a variety of habitats from near shore to the ocean abyss. They are most numerous at depths less than 200 m in tropical and warm temperate marine habitats.

70. Shark fisheries pre-date recorded history, and every part of sharks has been used for some purpose. The meat is an important food that is consumed fresh, dried, salted or smoked in many communities; shark-fins are among the world's most expensive fishery products. Shark cartilage and other products are increasingly sought for medicinal purposes. Few fisheries use the whole animal: some use only the meat; others only use the fins, livers or skin. In the majority of cases where only a portion of the animal is used, the rest is discarded at sea, which makes species identification of the catch difficult.

71. Fisheries for sharks are common throughout the world and use a variety of fishing gears and vessels. Sharks are taken mainly by gill net and hook or trawl. Small amounts are taken in traditional and recreational fisheries (including game fishers and divers) and in beach gill net and drumline fishing as bather protection programmes. There are several fisheries directed at one or a small number of species of shark, but most sharks are taken in multi-species fisheries, where the fishers tend to target more highly valued traditional bony fish species.

72. The following categories of shark fisheries can be identified: coastal hook and gill net fisheries; demersal trawl by-catch fisheries; deepwater by-catch fisheries; and pelagic by-catch fisheries (primarily by-catch in tuna longline and purse-seine fisheries). Since most shark catch is taken as by-catch, the majority of the catch is reported as unidentified shark or mixed fish, or is not reported at all. The lack of species identification of the catches and lack of information on fishing effort means basic data for fishery assessment are not available for most species.

73. An important concern about fisheries that catch sharks is that harvest strategies have a high probability of depleting the least productive species, unless methods for making fishing more selective are developed and implemented. As fishing effort increases, larger individuals and species disappear from the assemblage to be replaced by smaller counterparts. That results in a gradual drift towards shorter-lived, faster growing species, which negatively affects biodiversity.

3. Other highly migratory species

74. The species under the above heading, unlike tunas and to some extent sharks, have not attracted large or high-profile fisheries. Therefore, there is little information about the biology of such species and their state of exploitation, other than reported catches.[29]

(a) Pomfrets

75. The pomfrets (family Bramidae) include eight genera and 21 species of pelagic, benthopelagic and bathypelagic fishes found in temperate and tropical waters of the Atlantic, Indian and Pacific Oceans. Annex I to the Convention refers to the family Bramidae without listing individual species. The main characteristic of most of the species is that they are oceanodromous, that is, they migrate within oceans typically between spawning and different feeding areas, with migrations being cyclical, predictable and covering more than 100 km.

76. Worldwide landings of pomfrets are poorly documented. The FAO database lists Atlantic pomfret (*Brama brama*), pomfrets and ocean breams not elsewhere included (nei). Maximum landings were close to 18,000 tons in 2001, from 18 countries fishing in the Atlantic and Pacific Oceans, but in 2003, only 4,000 tons were reported. Because pomfrets are mostly caught as by-catch in other fisheries, there is very limited biological information on the species. Although their state of exploitation is not known, they are unlikely to be overexploited. According to FAO, they appear to be fully exploited in the east Indian Ocean and moderately exploited in the south-west Pacific.

(b) Sauries

77. Sauries belong to the Scomberesocidae family. The species included in annex I to the Convention are the Atlantic saury (*Scomberesox saurus saurus*), the Pacific saury (*Cololabis saira*), the saury (*Cololabis adocetus*), and the king gar (*Scomberesox saurus scombroides*).[30] The species are pelagic, schooling and oceanodromous. Although their state of exploitation is not known, sauries are unlikely to be overexploited.

78. The Atlantic saury (*Scomberesox saurus saurus*) lives near the surface in the north Atlantic, in the Baltic Sea and throughout the Mediterranean Sea. The Pacific

saury (*Cololabis saira*), is widely distributed in the north Pacific. It is generally found offshore, usually near the surface, and migrates seasonally. Most of the reported catches are from that species. The saury (*Cololabis adocetus*), is a tropical species of the east Pacific. The king gar (*Scomberesox saurus scombroides*) lives in brackish and marine waters, is only of minor commercial importance and occurs in the Atlantic, Indian and Pacific Oceans with circumglobal distribution in temperate waters of the southern hemisphere.

79. Six countries have reported saury landings to FAO. Annual landings have fluctuated between 200,000 tons and 600,000 tons since 1950 without a clear long-term trend since the early 1970s. Japan* accounts for 49 per cent to 98 per cent of reported total landings. The Pacific saury accounts for more than 95 per cent of reported landings.

(c) Dolphinfish

80. The two dolphinfishes of the Coryphaenidae family, the common dolphinfish (*Coryphaena hippurus*) and the Pompano dolphinfish (*Coryphaena equiselis*), are included in annex I to the Convention. Both species follow boats and associate with floating objects, which may be used as attracting devices in fisheries. The common dolphinfish (*Coryphaena hippurus*) is generally common in most warm and temperate seas 21° C to 30° C in the Atlantic, including the Mediterranean Sea, the west and east Indian Ocean and in the west central Pacific. The pompano dolphinfish (*Coryphaena equiselis*) has a worldwide distribution in tropical and subtropical seas. It is primarily an oceanic species but may enter coastal waters.

81. More than 40 countries reported dolphinfish landings to FAO (*C. hippurus* only). Reported landings show a sustained increasing trend from 7,000 tons in 1950 to almost 50,000 tons in the early twenty-first century. Seven reporting entities have consistently declared landings since 1950. The Pacific accounts for more than half of catches, with Japan* and Taiwan Province of China* being by far the largest contributors. Although the state of exploitation is not known, dolphinfish are unlikely to be overexploited.

C. Selected straddling fish stocks

82. The list of straddling stocks established by FAO in 1994[4] was taken as a starting point for the present review. Enquiries were sent to RFMOs soliciting regional knowledge to refine the lists. Information was received for the north-east and the south-east Atlantic. For the north-west and south-west Atlantic, and the north-east, east central and south-east Pacific, staff of the FAO Fisheries Department or its consultants applied their own informed judgements. For the west and east central Atlantic, south-west Pacific and Indian Ocean, catches by country were examined to determine which species were being reported by non-coastal States, which were presumed to be fishing on the high seas. The information was tempered by knowledge of situations where distant water fishing countries have access agreements to EEZs, particularly when the species in the reported catch were not known to be in commercial abundance on the high seas. Using that approach, a refined list of species (by FAO statistical area) likely to be fished as straddling stock and other high seas fish stock was prepared.

1. Pacific Ocean

(a) North-west Pacific

83. Straddling stocks in the north-west Pacific include Alaska (walleye) pollock (*Theragra chalcogramma*), flying squid (*Ommastrephes bartrami*), boreal clubhook squid (*Onychoteuthis borealijaponica*), boreopacific armhook squid (*Gonatopsis borealis*), Pacific Ocean perch (*Sebastes alutus*), pelagic armourhead (*Pseudopentaceros richardsoni*) and the alfonsino (*Beryx splendens*). According to FAO,[5] the pollock is considered fully exploited, while the squids vary from moderately to fully exploited and, in some cases, recovering. Based on reported landings, the Pacific Ocean perch is considered depleted, while the state of pelagic armourhead and alfonsino is not known.

(b) North-east Pacific

84. Straddling stocks in the north-east Pacific Ocean include jack mackerel (*Trachurus picturatus symmetricus*) and Alaska (walleye) pollock (*Theragra chalcogramma*). The jack mackerel is moderately exploited and the Alaska pollock is fully exploited.

(c) Western central Pacific

85. There is no information on straddling stocks in the western central Pacific.

(d) Eastern central Pacific

86. The straddling stocks of giant squid (*Dosidicus gigas*), horse mackerel (*Trachurus* spp.), and Spanish mackerel (*Scomber japonicus*) in the eastern central Pacific are moderately to fully exploited according to the 2005 FAO review.[5]

(e) South-west Pacific

87. There are two types of straddling fish stocks in the south-west Pacific: more common types associated with large continental shelves and another type associated with small islands with limited continental shelves whose fisheries depend on oceanic resources found both within and outside their EEZs. Species with straddling stocks include orange roughy (*Hoplostethus atlanticus*), oreo dories (*Allocyttus verrucosus, Allocyttus Niger, Neocyttus rhomboidalis, Pseudocyttus maculatus*) and hoki (*Macruronus novaezelandiae*). Straddling oceanic resources include the narrow-barred Spanish mackerel (*Scomberomorus commerson*), oceanic squids and flying fish. According to the 2005 FAO review,[5] orange roughy, oreo dories and hoki are fully exploited to overexploited. The Spanish mackerel, oceanic squid and flying squid are moderately exploited.

(f) South-east Pacific

88. Straddling stocks in the south-east Pacific Ocean include jumbo squid (*Dosidicus gigas*) and Chilean jack mackerel (*Trachurus picturatus murphyi*). Spanish mackerel (*Scomber japonicus*) is also found beyond the EEZs, but the catches are small. The Chilean jack mackerel is fully or overexploited, while the jumbo squid is moderately exploited.

2. Atlantic Ocean

(a) North-west Atlantic

89. Straddling stocks in the north-west Atlantic Ocean include cod (*Gadus morhua*), American plaice (*Hypoglossoides platessoides*), redfish (*Sebastes marinus*), witch flounder (*Glyptocephalus cynoglossus*), Atlantic halibut (*Hippoglossus hippoglossus*), black halibut (*Reinhardtius hippoglossoides*), yellowtail flounder (*Pleuronectes ferruginaeus*), grenadiers (*Macrouridae*), capelin (*Mallotus villosus*) and shrimp (*Pandalus borealis*).

90. Based on assessments by NAFO,[31] cod, American plaice, redfish, witch flounder, and Atlantic halibut are depleted; black halibut is overexploited, yellowtail flounder and shrimp are fully exploited, capelin are underexploited and the status of grenadiers is unknown. Stocks of some of the species on the Flemish Cap, such as cod and redfish, may be separate from EEZ stocks and, as such, may be other high seas fish stocks, rather than straddling stocks.

(b) North-east Atlantic

91. The main "traditional" straddling stocks in the north-east Atlantic Ocean are blue whiting (*Micromesistius poutassou*), oceanic redfish (*Sebastes mentella*), cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), black halibut (*Reinhardtius hippoglossoides*), Atlanto-Scandian (Norwegian spring-spawning) herring (*Clupea harengus*), mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*).

92. In addition to the foregoing species, NEAFC advises that most deep water species for which fisheries have recently developed should also be considered as being straddling. Those species are Baird's smoothhead (*Alepocephalus bairdii*), Risso's smoothhead (*Alepocephalus rostratus*), blue antimora (blue hake, *Antimora rostrata*), black scabbardfish (*Aphanopus carbo*), Iceland catshark (*Apristuris* spp.), greater silver smelt (*Argentina silus*), alfonsinos (*Beryx* spp.), tusk (*Brosme brosme*), gulper shark (*Centrophorus granulosus*), leafscale gulper shark (*Centrophorus squamosus*), black dogfish (*Centroscyllium fabricii*), Portuguese dogfish (*Centroscymnus coelolepis*), longnose velvet dogfish (*Centroscymnus crepidater*), deep-water red crab (*Chacon* (*Geyron*) *affinis*), rabbit fish (rattail) (*Chimaera monstrosa*), frilled shark (*Chlamydoselachus anguineus*), conger eel (*Conger conger*), roundnose grenadier (*Coryphaenoides rupestris*), kitefin shark (*Dalatias licha*), birdbeak dogfish (*Deania calceus*), black (deep-water) cardinal fish (*Epigonus telescopus*), greater lanternshark (*Etmopterus princeps*), velvet belly (*Etmopterus spinax*), blackmouth dogfish (*Galeus melastomus*), mouse catshark (*Galeus murinus*), bluemouth (blue mouth redfish) (*Helicolenus dactylopterus*), blondnose six-gilled shark (*Hexanchus griseus*), orange roughy (*Hoplostethus atlanticus*), silver roughy (pink) (*Hoplostethus mediterraneus*), large-eyed rabbit fish (ratfish) (*Hydrolagus mirabilis*), silver scabbard fish (cutless fish) (*Lepidopus caudatus*), eelpout (*Lycodes esmarkii*), roughhead grenadier (rough rattail) (*Macrourus berglax*), blue ling (*Molva dypterigia*), ling (*Molva molva*), common mora (*Mora moro*), sailfin roughshark (sharpback shark) (*Oxynotus paradoxus*), red (blackspot) seabream (*Pagellus bogaraveo*), forkbeards (*Phycis* spp.), wreckfish (*Polyprion americanus*), round skate (*Raja fyllae*), Arctic skate (*Raja hyperborea*), Norwegian skate (*Raja nidarosiensis*), straighnose rabbitfish (*Rhinochimaera*

atlantica), knifetooth dogfish (*Scymnodon ringens*), small redfish (Norway haddock) (*Sebastes viviparus*), Greenland shark (*Somniosus microcephalus*) and spiny (deep-sea) scorpionfish (*Trachyscorpia cristulata*).

93. Fisheries for deep water species have developed rapidly since 1990 in the north-east Atlantic Ocean. In October 2005 ICES provided advice for the management of those fisheries.[32] Although the state of exploitation of most species/stocks cannot be assessed with respect to standard criteria, the overall evaluation by ICES is that those fisheries are currently not sustainable. Based on ICES advice in 2005, none of the traditional straddling stocks are under or moderately exploited, herring and oceanic redfish are fully exploited, blue whiting, cod, haddock, black halibut and mackerel are overexploited and the state of horse mackerel is uncertain.

(c) Eastern central Atlantic

94. The analysis identified catches of, inter alia, common cuttlefish, marine fishes nei, octopuses nei, red porgy, West African goatfish, common sole, cuttlefish, bobtail squids nei, European hake, Natantian decapods nei, croakers, drums nei, tonguefish, chub mackerel, European pilchard, jack and horse mackerel nei, alfonsinos, flatfishes nei and Senegalese hake from countries that have fishing agreements with coastal States. It was therefore concluded that there are no significant fisheries for straddling stocks outside of EEZs at present in the eastern central Atlantic.

(d) West central Atlantic

95. The analysis of catches by non-coastal States was also performed for the western central Atlantic. It identified catches of a mixture of coastal and oceanic species in general categories such as, inter alia, sharks, rays, skates, nei, croakers, drums nei, hairtails, scabbardfishes nei, marine fishes nei and natantian decapods nei, which suggest that such catches were probably made within EEZs under fishing agreements with coastal States. It seems that there are no significant fisheries for straddling stocks outside EEZs at present in the western central Atlantic.

(e) South-west Atlantic

96. Straddling stocks in the south-west Atlantic include short-fin squid (*Illex argentinus*), common squid (*Loligo* spp.), a flying squid (*Martialia hyadesi* of the Ommastrephidae family), hakes (*Merluccius hubbsi* and *Merluccius polylepis*), the southern blue whiting (*Micromesistius australis*), the pink cusk eel (*Genypterus blacodes*), the Patagonian toothfish (*Dissostichus eleginoides*), the tadpole mora (*Salilota australis*), the Patagonian grenadier (*Macruronus magellanicus*), the grenadier (*Macrourus whitsoni*), the Antarctic cod (*Notothenia rossii*), rockcods (*Notothenia* spp.) and sharks and rays.

97. The state of fisheries for common squid, the flying squid, the tadpole mora, the grenadier, the Antarctic cod, the rockcods and the sharks and rays is unknown. The Patagonian grenadier is moderately exploited; the Patagonian toothfish[33] and the pink cusk eel are moderately to fully exploited, the short-fin squid is fully exploited, the southern blue whiting is fully exploited to overexploited and the hakes are overexploited or depleted.

(f) South-east Atlantic Ocean

98. SEAFO identifies the following species as straddling: alfonsinos (Family Bercycidae); orange roughy; horse mackerel (*Trachurus* spp.); lanternfish (Family Myctophidae); mackerel (*Scomber* spp.); skates (Family Rajidae); sharks (Order Selachomorpha); armourhead (*Pseudopentaceros* spp.); cardinal fish (*Epigonus* spp.); deep sea red crab (*Chaceon maritae*); octopus (Family Octopodidae); squids (Family Loliginidae); and wreckfish (*Polyprion americanus*). The state of exploitation is unknown for all of the species except horse mackerel, which are classified as fully exploited.

3. Indian Ocean

99. No fisheries on straddling stocks have been identified in the Indian Ocean. There are straddling resources (for example, deep water snapper), but they are not fished to any significant extent. As noted above, there are also areas in the Indian Ocean that are suitable for straddling stocks in terms of topography, with relatively shallow water extending from an EEZ into the high seas. However, fishing of straddling stocks does not seem significant at present in those areas.

4. Southern Ocean

100. The Southern Ocean is considered to be delimited by the Antarctic Convergence where cold Antarctic waters meet warmer waters of the Atlantic, Pacific and Indian Oceans to the north. The location of the Antarctic Convergence varies over time, but it is in the vicinity of 60 degrees south. The Antarctic Convergence is generally considered to form the boundary of the Southern Ocean ecosystem, with relatively few species passing through it. Given the unique situation of the Southern Ocean, the present review reports on all of the species fished in the convention area of CCAMLR as if they were straddling fish stocks or other high seas fish stocks. There are no fisheries for highly migratory species in the Southern Ocean at present.

101. Prior to the mid-1960s, only whale catches from the Southern Ocean were reported to FAO. Since then, the fisheries have targeted various species, including marbled rockcod, mackerel icefish, humped rockcod, south Georgian icefish, Patagonian and Antarctic toothfish and Antarctic krill. Reported catches exceeded 600,000 tons in the early 1980s, but since the early 1990s, they have been relatively stable at around 100,000 tons per year, albeit with a tendency to increase. From 1990 to 2003, the catches were dominated by Antarctic krill (86 per cent), Patagonian toothfish (6 per cent), a lanternfish (*Electrona carlsbergi*), the electron subantarctic (5 per cent) and the mackerel icefish at less than 2 per cent. More than 50 species are reported in the remaining 1 per cent of the total catches.

102. Information on the state of exploitation of Southern Ocean resources was provided by the CCAMLR secretariat. Antarctic krill (*Euphausia superba*) is considered underexploited in FAO Areas 48 and 58, while lanternfish (*Electrona carlsbergi*), the sevenstar flying squid (*Martialia hyadesi*) and crab (*Paralomis spinosissima and P. formosa*) in FAO Area 48 are also considered underexploited. Patagonian toothfish (*Dissostichus eleginoides*) is considered overfished in parts of FAO Area 58 and fully exploited in FAO Area 48 and other parts of FAO Area 58. Mackerel icefish (*Champsocephalus gunnari*) is fully exploited in both FAO Areas

48 and 58, while the state of marbled rockcod (*Notothenia rossii*), for which the fishery is closed, is uncertain.

5. Mediterranean Sea

103. GFCM uses the concept of shared stocks, exploited by two or more countries on the high seas and only by the riparian countries in territorial waters. Such stocks in the Mediterranean include hake (*Merluccius merluccius*) in the Gulf of Lions, deep sea shrimps, the blue and red shrimp (*Aristeus antennatus*) and the giant red shrimp (*Aristaeomorpha foliacea*), sardines (*Sardina pilchardus*) in the Sea of Alboran and Adriatic Sea and anchovy (*Engraulis encrasicolus*) in the Gulf of Lions and the Adriatic Sea. According to the 2005 FAO review,[5] the state of exploitation of giant red shrimp is not known, rose shrimp is fully exploited and hake is overexploited. Sardines and anchovies range from underexploited to overexploited depending on the zone.

D. Other high seas fish stocks

104. This section considers fish stocks that are not highly migratory species and that occur exclusively in the high seas. Most of the currently known high seas stocks are deep water species, but several others may be pelagic species.[34] Most fisheries[35] for those deep water species are relatively recent and the development of most of them has outpaced the ability to obtain scientific information and to implement effective management. Relatively little is known about many of the species and most of the fisheries.

105. Deep water species live at depths where there is virtually no light or primary productivity. Most nutrients and production are retained in surface waters above the permanent thermocline. Although many species migrate vertically to feed at night, those that do not, depend (directly or indirectly) on a rain of dead plants and animals from surface waters for food. Some species only inhabit deep waters in their adult stage and may be exploited during both their shallow and deep water phases. Deep water species have diverse life history strategies, although little is known about their stock structure, migrations and general biology and ecology. Since they live in low productivity environments, they are expected to be slow-growing and to mature late in life, which has been confirmed for some important species.[36] Some species form dense aggregations that are accessible to fisheries on topographic features like seamounts, ocean ridges and canyons. Because of those characteristics, deep water species are believed to be particularly vulnerable to overexploitation and depletion.

106. While most fish families of deep water species occur worldwide, the existence of deep water basins bounded by the continents and oceanic ridges has resulted in regional differences. Another important feature of deep water fishes is that new discoveries continue to be made, such as the recent discovery of a 4.5 m megamouth shark (*Megachasma pelagios*) weighing 750 kg and a six-gilled ray (*Hexatrygonidae*), both representing new taxonomic families.

107. Important species that form deep water aggregations include orange roughy (*Hoplostethus atlanticus*) and the oreos (inter alia, *Allocyttus* spp. and *Neocyttus* spp. *Pseudocyttus* spp.), which are often fished together, alfonsinos (*Beryx* spp.) in lower latitude fisheries, Patagonian toothfish (*Dissostichus eleginoides*) in Southern

Ocean fisheries, pelagic armourhead (*Pseudopentaceros wheeleri*) and various species of Scorpaenidae found on both coasts of North America.

108. Major fisheries for deep water species (particularly orange roughy) first developed off New Zealand and Australia in the late 1970s and 1980s, and they have developed rapidly elsewhere since 1990. The development of deep water fisheries has been prompted by three related factors: (a) depletion of species and stocks in shallower water; (b) the high value of some deep water species; and (c) advances in technology that make fishing in deep water possible. On the high seas, management of deep water fisheries has lagged behind the development of the fisheries. However, in October 2005 ICES provided precautionary advice for the management of deep water fisheries under the purview of NEAFC. The ICES evaluation is probably broadly applicable (adapted for a more general context):

> "Most exploited deepwater species are considered to be harvested unsustainably; however, it is currently not possible to provide advice for specific fisheries for deep sea species. Consistent with a precautionary approach, [...] immediate reduction in established deep sea fisheries [should occur] unless they can be shown to be sustainable. Measures should also be implemented to reduce exploitation of deep sea species by fisheries primarily targeting shelf species (hake, anglerfish and megrim). New deep sea fisheries or expansion of existing fisheries into new fishing areas should not be permitted unless the expansion is very cautious and is accompanied by programmes to collect data which allow evaluation of stock status as the basis for determining sustainable exploitation levels [...]. For several species there is a concern that catch rates can only be maintained by sequential depletion of relatively isolated concentrations/sub-units of a stock. The smallest unit for which data are reported at present [...] may not be appropriate for monitoring or managing this type of fishing activity. The depth range within an area may be very wide, and the sizes of the areas are very different."

1. Orange roughy (*Hoplostethus atlanticus*)

109. The orange roughy (*Hoplostethus atlanticus*) is found in the north and south Atlantic, in the south Indian Ocean, the Tasman Sea, around New Zealand and in the south Pacific. They are found within EEZs; some are straddling stocks, while others occur entirely on the high seas. The species is mainly caught at depths over 800 m by fisheries on fish aggregations associated with seamounts. The proportion of the resource outside of the fished area is not known. Fisheries appear to have serially depleted fish aggregations that may or may not correspond to distinct stock units. Recruitment appears to be irregular. The time lag between spawning and recruitment to the spawning aggregations is so long (about 20 years) that it is difficult to judge the influence of fisheries on recruitment. The theory upon which the concept of a sustainable yield is based implies that there should be a compensatory response in recruitment as a result of fishing, but there is no evidence so far that that is the case for orange roughy. Sustainable exploitation rates are thus bound to be very low and may be in the order of 5 per cent of biomass.

2. Oreo dories (*Allocyttus* spp., *Neocyttus* spp. and *Pseudocyttus* spp.)

110. The oreo dories (*Allocyttus* spp., *Neocyttus* spp. and *Pseudocyttus* spp.), members of the Oreosomatidae family, occur close to the seabed in deep waters.

They form large aggregations over rough grounds near seamounts and canyons in the Antarctic, the Atlantic, Indian Ocean and the Pacific.[37] The proportion of the resource outside the fished area is not known and fisheries appear to have serially depleted fish aggregations that may or may not correspond to distinct stock units. Recruitment appears at best irregular and, like orange roughy, there is no evidence of a compensatory response in recruitment. Estimates from New Zealand indicate maximum sustainable yield to be of the order of 1.6 per cent of initial biomass if the population is not to be reduced by more than 80 per cent with a 20 per cent probability.

3. Alfonsino (*Beryx splendens*)

111. Alfonsinos (*Beryx splendens*) belong to the Berycidae family and are found in the Atlantic, Indian and west and central Pacific Oceans. They inhabit the outer shelf and slope to a depth of at least 1,300 m, and may make vertical migrations at night. *Beryx splendens* are caught in mid-water trawls over shallower seamounts, underwater ridges and on the slope edges between depths of 300 and 500 m. Genetic studies suggest that alfonsinos may have an ocean-wide population structure, but the relationship between the various fish aggregations is not known. If the hypothesis of an ocean-wide population structure is true, it could be that individual aggregations cannot be exploited sustainably if most recruitment originates irregularly from one or a few areas (which can differ from year to year). If fishing depletes an aggregation that was destined to supply recruits over a large geographic area, the adverse effect on the broader population may be much greater than a localized depletion. Some aggregations may occur in areas that are rarely suitable for recruits to settle and fishing on those aggregations will not be sustainable. Unlike many deep water species, the growth and mortality rates of alfonsinos are relatively high (natural mortality is estimated to be around 0.23), which means that the species should be better able to sustain a fishery than other less productive deep water species.

4. Toothfishes (*Dissostichus* spp.)

112. Toothfishes (*Dissostichus* spp.), belong to the Nototheniidae family and have a circumpolar distribution within Antarctic and Southern Ocean waters. Patagonian toothfish (*D. eleginoides*) are found asymmetrically around southern South America, while Antarctic toothfish (*D. mawsoni*) occur in high latitudes in the Pacific region. The two species overlap between 60° south and 65° south and both occur to depths of 3,000 m. The northern limit for most populations of Patagonian toothfish is 45° south, except along the Chilean and Argentinian coasts where they may extend north in deeper, cold water. Significant populations of Patagonian toothfish exist in the waters of, and adjacent to, the various sub-Antarctic islands and in the waters of Argentina,* Chile,* Peru* and Uruguay.

5. Pelagic armourhead (*Pseudopentaceros wheeleri* and *P. richardsoni*)

113. Pelagic armourhead (*Pseudopentaceros wheeleri* and *P. richardsoni*), belong to the Pentacerotidae family. The species is associated with seamounts, especially in the north Pacific, but the family is distributed throughout the Indian and Pacific Oceans and in the south-west Atlantic. The fishery for pelagic armourhead illustrates the potential evolution of seamount fisheries. Japanese and Soviet Union vessels began trawling in the Emperor Seamount chain and the Northern Hawaiian

Ridge areas in 1969. The total catch for the Soviet Union vessels is not known, but is estimated at over 133,400 tons in the period from 1967 to 1977. From 1969 to 1977, two to five Japanese trawlers fished the area averaging catches of 22,800 to 35,100 tons a year. From 1977 to 1982, catches fell to 5,800 to 9,900 tons. Ninety per cent of the catch was pelagic armourhead. The once dominant pelagic armourhead were later replaced by alfonsino, although the alfonsino has never been as abundant as the pelagic armourhead. There is no evidence that either of the fish stocks will recover enough to allow commercially viable fisheries in the near future.

6. Hoki (*Macruronus novaezelandiae*)

114. Hoki (*Macruronus novaezelandiae*) is a benthopelagic Merlucciidae, which usually lives near the bottom in the south-west Pacific, but the species also form mid-water aggregations for spawning. Large adult fish generally occur deeper than 400 m, while juveniles may be found in shallower water. Mid-water trawl fisheries target aggregations near canyons that are often close to coasts in areas of narrow continental shelves. While fisheries for hoki are generally considered high seas deep water fisheries, most of the catch is from EEZs. The stock structure is uncertain and it is not always clear that total allowable catches set for specific geographic areas correspond to distinct biological units.

7. Other species

115. In addition to the species described above, a number of deep water species have been treated as straddling stocks in the north-east Atlantic. Some of them potentially make up other high seas fish stocks.

116. A further suite of deepwater, or at least slope, species have been the target of fisheries in many tropical regions. They can be targeted by small-scale deep water fisheries usually along the shelf break and shelf slope wherever the continental shelf is relatively narrow and the fishing grounds are accessible to fishermen using small fishing boats. The principal species consist of members of the Lutjanidae (snappers), Serranidae (sea basses: groupers and fairy basslets) and Carangidae (jacks and pompanos) families and mostly importantly include the Eteline snappers (for example, *Etelis coruscans* and *E. carbunculus*) and the jobfishes (for example, *Pristipomoides filamemtosus*, *Pristipomoides typus* and *Pristipomoides multidens*). Those fisheries are particularly important to small island States, although they are also widely found along the continental margins in tropical and subtropical areas.

E. Associated species

117. As mentioned above, associated species are considered to be impacted species that are not part of the landed catch. Fisheries for straddling fish stocks, highly migratory fish stocks and other high seas fish stocks impact other species as a result of (a) discards, (b) physical contact of fishing gear with organisms and habitat that are not caught and (c) indirect processes. Those mechanisms are considered below.

1. Discards

118. Although information is still limited, much more is known about discards than the other mechanisms through which fisheries impact associated species. The most recent global information on discards is described in a recent FAO report.[10] It

estimates that the rate of discards is about 8 per cent for all marine fisheries combined, with large differences by countries, gear types, target species and statistical areas.

119. Shrimp trawling has the highest estimated average discard rate (62.3 per cent), but the rates vary widely between fisheries (from 0 to 96 per cent). There are a variety of finfish and invertebrate species caught, including juveniles of target species of many fisheries. Most shrimp trawling is on stocks confined to the EEZs, although some straddling or other high seas stocks of shrimp are fished. They are likely to be fisheries in relatively deep water for coldwater species, such as the fishery for *Pandalus* shrimp on the Flemish Cap off Newfoundland and off Labrador in the north-west Atlantic (FAO Statistical Area 21). The aggregate discard rate for cold/deep water shrimp fisheries is 39 per cent, but where use of by-catch reduction devices is mandatory, as in the north-west Atlantic, the discard rate is relatively low, in the order of 5 per cent.

120. After shrimp trawling, longline fishing for highly migratory species, primarily tuna and tuna-like species, has the highest discard rate (averaging 28 per cent with a range of 0 to 40 per cent). Other fisheries for highly migratory species have much lower discard rates: 5 per cent for tuna purse seines and 0.4 per cent for tuna pole and line fishing. The total discards by those highly migratory species fisheries is estimated to be about 700,000 tons annually. The portion discarded by high seas fisheries is unknown, but it is likely to be substantial.

121. The most common discard species from longlines is the blue shark. Other sharks, target species damaged by sharks and marine mammals, frigate tuna, kawakawa, Indo-Pacific king mackerel and narrow-barred Spanish mackerel are also taken and discarded. Albatross, petrels and other seabirds are also caught by longlines. For tuna purse seines, some of the discarded species are bonito, dogtooth tuna, rainbow runner, dolphinfish, jacks, sharks, billfish, mantas and undersize target species (that is, skipjack and yellowfin tuna). Dolphins are also encircled by purse seines in some areas.

122. Fisheries for straddling demersal fish stocks and other high seas demersal fish stocks are primarily conducted with bottom trawlers. The estimated discard rate for trawlers targeting demersal finfish is 9.6 per cent. There is no basis for judging if the rate is likely to be higher or lower for straddling fish stocks and other high seas fish stocks than for stocks entirely within EEZs. However, as the catch from stocks entirely within EEZs accounts for most of the total catch, those EEZ fisheries must account for most of the 1.7 million tons of estimated discards by bottom trawlers targeting demersal finfish. Many species are discarded depending on the target species (typically the species composition differs between flatfish and roundfish fisheries), geographic area and depth. Discards of juveniles of the target species are common, along with species with low commercial value, such as horse mackerel, long jawed mackerel (*Rastrelliger* spp.), elasmobranchs (for example, dogfish and skates), arrowtooth flounders and flathead sole. Many benthic invertebrates are discarded, such as molluscs, echinoderms (for example, urchins and starfish), crabs, rajids and whelks. Deep water trawling results in discards of additional species, such as grenadiers, whiptails, rabbitfish, oreos, chondrichthyans (for example, birdbeak dogfish), batoids and chimaeroids, and cold water corals (*Lophelia* sp.).

123. In addition to bottom trawling, demersal longlining is important in the CCAMLR area (Statistical Areas 48, 58 and 88). The discard rate for such fishing is

estimated to be 7.5 per cent (ranging from 0.5 to 57 per cent). The overall discard rate in the area is estimated to be 12.7 per cent, resulting in about 2,000 tons annually.

124. Most discards are of finfish and invertebrate species that are so abundant that there is little risk that their reproduction may become seriously threatened. However, there are some species with such low abundance that they are threatened with extinction. In addition, there are species, the so-called "charismatic species", which significant segments of society want protected regardless of their abundance. Some such species also have a significant extinction risk. Marine mammals, sea turtles and sea birds have longstanding status as charismatic species and/or species at risk (of extinction). More recently, cold water corals (*Lophelia* sp.) have gained public attention and might also be regarded as charismatic. Some species of cold water corals might have extremely small geographic ranges (for example, on the top of a single seamount), which means they may be vulnerable to localized depletion and possibly extinction, and could be charismatic.

125. Charismatic species and species at risk of extinction are known by-catch of fisheries for highly migratory fish stocks, straddling fish stocks and other high seas fish stocks. Sea turtles and sea birds are well documented by-catch in longline fisheries for tuna and tuna-like species. Sea birds are also taken by longline fisheries for tunas (as in the southern bluefin tuna fishery) and for demersal species, such as the Southern Ocean demersal longline fishery for toothfish.

126. Concern about longline by-catch of turtles in fisheries for highly migratory fish stocks prompted FAO to hold both an Expert Consultation[38] and a Technical Consultation[39] to consider ways of reducing mortality. Recent experiments aimed at reducing sea turtle by-catch and mortality are promising. For example, changes in hook shape and bait type reduced the catch rate of loggerhead turtles and leatherback turtles by 90 per cent and 75 per cent in the north-west Atlantic. In general, the impact of sea turtle by-catch by longline fisheries is unknown, but it could jeopardize species that are severely depleted, even if the longline fisheries are not the primary cause of the depletion.

127. By-catch of marine mammals is known to occur in some trawl fisheries (particularly large high speed pelagic trawls) and to a lesser extent on longlines. It is unclear to what degree marine mammal by-catch by trawlers and longliners occurs in high seas fisheries, but there is probably some. In the case of purse-seine fishing for tuna in the east Pacific Ocean, dolphins are intentionally encircled in the nets since they are an indicator of the location of schools of tuna. The practice has resulted in a cumulative mortality of several million dolphins since 1960, jeopardizing some dolphin species. That led to the negotiation of AIDCP, which entered into force in 1999, and whose secretariat is provided by IATTC. The programme reduced mortality drastically from 132,000 dolphins in 1986 to about 1,500 in 2003. In spite of that success, dolphin populations appear to have been slow to recover.[40]

128. The recent expansion of deep water trawl fisheries into areas previously not fished has resulted in the by-catch of cold water corals (*Lophelia* sp.), sometimes as boulder-sized pieces. Rarely has the impact of expanding deep water trawl fisheries been documented from the initiation of fishing, but for the fishery for orange roughy on the South Tasman Rise, in the Australian EEZ south of Tasmania, observers estimated in the first year of the fishery that 10 tons of coral were brought up per

tow. That extrapolates to 10,000 tons of coral associated with a catch of about 4,000 tons of orange roughy.[41]

2. Physical contact by fishing gear with organisms that are not caught

129. Trawling is the primary type of fishing operation that causes physical contact between fishing gear and associated species and their habitat. The by-catch of cold water corals is probably a symptom of a larger impact of trawling as reefs are damaged without traces of corals being hauled up in nets. Trawls also come into physical contact with the bottom in areas where reefs are not present and here the effects are less obvious, but ecosystems are altered and species of benthic organisms will be differently affected.

130. Indirect processes affect the growth, survival and reproduction of species that are the target of fisheries, as well as associated species. When fisheries remove fish from populations, food webs are altered. Some species may suffer from the loss of prey; others may benefit from removal of their predators. Species that compete will be affected differently with cascading impacts on other dependent species.

131. Alteration of the sea bottom resulting from physical contact by fishing gear probably changes habitat suitability, thus indirectly affecting associated species. For example, some species depend on complex three dimensional biogenic structures, such as reefs, for shelter from predators. When such structures are destroyed, the species may disappear.

132. Impacts through indirect processes are hard to detect and even harder to predict.[42]

3. Finfish and invertebrate species

133. Longtail tuna (*Thunnus tonggol*), slender tuna (*Allothunnus fallai*), butterfly kingfish (*Gasterochisma melampus*), wahoo (*Acanthocybium solandri*) and Spanish mackerel (*Scomberomorus* spp.) are not included in annex I to the Convention, but they share many characteristics with some of the species included. Here, they are considered associated species.

134. The flying fish (Exocoetidae, genera *Exocoetus*, *Cypselurus*, *Hirundichthys*, *Cheilopogon* and *Prognichthys*), the sunfish or headfish of the family Molidae, the snake mackerel (*Gempylus serpens*), escolar (*Lepidocybium flavobrunneum*) and oilfish (*Ruvettus pretiosus*) of the Gempylidae family, are species which are caught close inshore but migrate far offshore. They are all part of the regular by-catch of the tuna longliners together with the lancetfish (*Alepisaurus ferox* and *Alepisaurus brevirostris*).

III. Review of the extent to which the Agreement has been incorporated into subregional or regional agreements or arrangements to conserve and manage straddling fish stocks and highly migratory fish stocks, as well as national legislation related to the implementation of the Agreement, and of measures that have been adopted relevant to those stocks

135. RFMOs have a crucial role to play in implementing the Agreement. There are nine key RFMOs with mandates to manage straddling fish stocks and highly migratory fish stocks: CCAMLR,[43] CCSBT,[44] IATTC,[45] ICCAT,[46] IOTC,[47] NAFO,[48] NEAFC,[49] SEAFO[50] and WCPFC.[51] The mandates of CCAMLR, NAFO, NEAFC and SEAFO are to manage straddling stocks and high seas discrete stocks, while those of CCSBT, IATTC, ICCAT, IOTC and WCPFC are to manage highly migratory fish stocks.

136. In addition, Alaska pollock on the high seas in the Central Bering Sea is managed by the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea (Donut Hole Convention)[52] and east Atlantic bluefin tuna and swordfish are managed by GFCM.[53]

A. Conservation and management of stocks

137. Article 5 of the Agreement sets out the general principles to be applied by coastal States and States fishing on the high seas in order to conserve and manage straddling fish stocks and highly migratory fish stocks. Article 5 (a)-(c) of the Agreement provides, among other things, that in order to conserve the stocks concerned, States are required to adopt measures to ensure their "long-term sustainability" and promote the objective of their optimum utilization; to ensure that such measures are based on the best scientific evidence available; and to apply the precautionary approach in accordance with article 6 of the Agreement. Annex II to the Agreement provides guidance for the application of precautionary reference points in conservation and management of the stocks concerned. Furthermore, article 10 (d) of the Agreement requires States to obtain and evaluate scientific advice through RFMOs.

1. Adoption of measures

138. *Scientific advice*. The Agreement provides that States shall adopt conservation and management measures for straddling fish stocks and highly migratory fish stocks based on the best scientific evidence available. Scientific advice for the conservation and management of the stocks concerned is obtained through RFMOs and their scientific bodies. For areas or regions where RFMOs do not exist, States obtain the scientific advice from national research institutions and/or through cooperation with other States. All RFMOs indicate that catch levels and other regulatory measures are based on scientific advice received from their respective scientific bodies.

139. *Precautionary approach*. Article 6 (1) of the Agreement requires States to apply the precautionary approach widely to conservation, management and

exploitation of straddling fish stocks and highly migratory fish stocks in order to protect the living marine resources and preserve the marine environment. Application of the precautionary approach to fisheries management is aimed at reducing the risk of overexploitation and depletion of fish stocks. The use of precaution is required at all levels of the fishery system, including development planning, conservation and management measures, management decisions, research, technology development and legal and institutional frameworks. The precautionary approach recognizes that changes in fisheries systems are only slowly reversible, difficult to control, not well understood and subject to changing environment and human values, and that the lack of full scientific information should not be used as a reason for postponing cost-effective measures to prevent environmental degradation where there are threats of serious or irreversible damage.

140. In practice, the precautionary approach entails the setting of reference points that signal objectives for management and threshold levels for spawning stock size and fish mortality. The objectives of management are to ensure that the fish mortality rates and the size of the spawning stock biomass are maintained at or above desired levels. The precautionary approach is, and will remain, a work in progress. Its introduction to practical fisheries management over the last decade has brought experience and lessons that scientists and administrators are now trying to incorporate into future development of the approach. One critical issue is how threshold levels should be set for spawning stock sizes and rates of decline (fish mortality).

141. *Regional fisheries management organizations.* CCAMLR, CCSBT, IATTC, IOTC, NAFO and NEAFC indicate that they have made efforts to implement new approaches to fisheries conservation and management, especially the precautionary approach. Measures to that effect include the following: collecting and analysing data on target and dependent/related species and weighing up the extent and effect of uncertainties and gaps in such data before making management decisions; limiting fleet capacity at a precautionary level; establishing agreements, action plans/guidelines for the precautionary approach; setting up precautionary quotas; and requesting scientific advice on precautionary buffer zones for reference levels.

142. CCAMLR has for many years incorporated the precautionary approach into stock assessment and decision-making. All regulated fisheries in areas under CCAMLR jurisdiction are subject to precautionary catch limits as advised by its Scientific Committee.[54] In addition, both krill and Patagonian and Antarctic toothfish fisheries are subject to (pre-determined) decision rules. CCAMLR is pioneering efforts to manage marine ecosystems according to the precautionary principle in order to ensure that new and exploratory fisheries do not develop faster than the ability of the Commission to evaluate their potential consequences.

143. CCSBT, based on advice from its Scientific Committee,[55] agreed in 2005 to adopt a management procedure for the determination of a total allowable catch for the southern bluefin tuna fishery. The management procedure was selected and constructed to promote the rebuilding of the stock and to ensure that there is a 50 per cent chance that the spawning stock biomass will be above the 2004 level by 2014.

144. IATTC has, since the 1980s, taking into account scientific advice,[56] included precaution in the absence of information. IATTC interprets maximum sustainable yield as a limit reference point. If catches for target species reach the yield limit,

management measures are imposed. A working group on reference points has been established to suggest precautionary limits and targets. IATTC adopted a resolution (C-04-09) to establish a multi-annual programme (2004-2006) for the conservation of tuna, including quotas in the east Pacific and the Commission has agreed to freeze the effort for albacore tuna in the north Pacific (IATTC resolution C-05-02).

145. The ICCAT Scientific Committee[57] created an ad hoc working group on the precautionary approach in 1997, which last met in 2001, in conjunction with the Committee. ICCAT reports that the precautionary approach is not adopted as a formal decision-making mechanism. However, the adopted conservation and management measures are designed to maintain or rebuild stocks to levels that can permit the maximum sustainable catch.

146. IOTC has adopted the precautionary approach through the principle of incorporating uncertainty in stock assessments, as advised by its Scientific Committee.[58] Recognizing that a reduction in the catches of bigeye tuna from all fishing gears should be implemented as soon as possible, the Commission introduced resolution 05/01 to limit the catch of bigeye tuna to recent levels, while over the next three years the Commission is to develop a mechanism to allocate to all contracting parties bigeye tuna quotas for specific time periods.

147. NAFO established a precautionary approach working group in 1997, comprising participants from the Fisheries Commission and the Scientific Council,[59] which led to the adoption of the concept of a precautionary approach to fisheries management in 1999. In 2004, NAFO agreed to a precautionary approach framework and adopted separate measures to apply the framework initially to two stocks.[60]

148. In 1996, NEAFC requested ICES[61] to include the precautionary approach in advice provided to the Commission. ICES annual advice includes management recommendations on precautionary reference points. Long-term management plans and harvest control rules exist for three stocks.[62] On a precautionary basis, NEAFC members have also agreed to an overall reduction of 30 per cent in effort in fisheries for deep sea species, as no scientific advice is available on a stock by stock basis for those stocks at present.

149. SEAFO and WCPFC have included the application of the precautionary approach as a management tool in their respective conventions,[63] but so far it has not been implemented, as the organizations have just recently become operative. Work has, however, already started within their respective scientific committees.[64]

150. *States*. Belize, Canada, Cyprus, the European Community, Finland, Ireland, Kuwait,* Mexico,* Morocco,* Myanmar,* New Zealand, Norway, the Philippines,* Pakistan,* Portugal, Qatar,* the Republic of Korea,* Saudi Arabia,* Serbia and Montenegro,* the United States and Uruguay indicate that their conservation and management measures provide for the application of the precautionary approach to fisheries management. Many of their responses do not explain, however, how the precautionary approach has been implemented. Other States explain that they have adopted such measures within the precautionary framework established by the body which provides them with scientific advice, including advice based on the use of precautionary reference points, such as limit reference points and target reference points.[65] Canada, the European Community, New Zealand, Norway, the United States and Uruguay also report that they have adopted domestic legislation to

implement the provisions of article 6 of the Agreement. In many cases such legislation requires all management decisions to take into account the best scientific evidence available as well as any uncertain, unreliable, or inadequate information available at the time of decision-making, without allowing the absence or uncertainty of information to be used as a reason for postponing or refraining from taking the necessary measures.

151. Canada reports that collapses of major cod stocks in the 1990s gave considerable momentum to new approaches, including the definition of reference points for fisheries management. The precautionary approach was linked to the concept of serious harm, which was defined as recruitment overfishing. For the purpose of national implementation, workshops were held in 2001, 2002, 2003 and 2004, which subsequently refined the definition and calculation of limit reference points. Since early 2004, a national study group has been further advancing the work on reference points by using a variety of stocks as case studies. Several stocks have limit reference points and/or fishing mortality references and targets for healthy biomass levels.[66] The work is ongoing and is to be expanded further into invertebrate stocks.

152. ICES has provided precautionary advice on catch levels since the late 1990s. In 2002, the Joint Norwegian-Russian Fisheries Commission decided that from 2004 onwards multi-annual quotas based on a precautionary approach should apply.[67] A new management strategy, adopted in 2003, ensures that quota levels for any three-year period will be in line with the precautionary reference values provided by ICES. Cooperation between the European Community and Norway involves work on long-term management plans for certain stocks, with a view to reaching agreement on management objectives and the time frame within which they are to be achieved. The development and effective implementation of those plans, as adopted for North Arctic cod, North Arctic haddock and North Arctic capelin in the Barents Sea and shared cod, haddock, herring, plaice and saithe stocks in the North Sea, provide decision makers with long-term scenarios of the effects of their decisions.

153. The European Community, the Faroe Islands[68] and Norway have agreed for 2001 and subsequent years to implement a long-term management plan for the north Atlantic mackerel stock, consistent with a precautionary approach and designed to provide sustainable fisheries and a greater potential yield.[69] Furthermore, the European Community, the Faroe Islands, Iceland and Norway have agreed on a long-term management plan for the blue whiting stock,[70] and in 1999, the same parties and the Russian Federation agreed on such a plan for the Norwegian spring-spawning (Atlanto-Scandian) herring.[71] Those three plans have also been considered and approved by NEAFC, which manages the high seas components of the stocks.

2. Overfishing and capacity management

154. Article 5 (h) of the Agreement provides that measures shall be taken to prevent or eliminate overfishing and excess capacity and to ensure that levels of fishing effort do not exceed those commensurate with sustainable use of fishery resources. Overfishing is often caused by excess capacity in the fishing industry where the harvesting capacity of the fleet exceeds the amount of resource available for harvest. Excess capacity is often the result of rapid development without adequate scientific information on available yields from the resource,[72] as well as subsidies extended to

the fisheries sector in the form of, inter alia, capital support for vessel purchases, fuel subsidies or related tax exemptions and cheap credit.

155. Excess capacity is often caused by open access regimes, particularly those prevailing on the high seas. Such regimes are characterized by a so-called Olympic fishery: a race by individual vessels to catch as many fish as possible, as quickly as possible. Other causes of overfishing are uncertain scientific information and risk-prone decisions in the face of pressure to postpone economic and social hardships. While environmental factors have also adversely affected some fish stocks, excessive levels of fishing capacity are believed to be the primary cause of fisheries declines. Moreover, fishing overcapacity is also known to have contributed to the problem of fishing, particularly in cases where excess capacity has been exported through re-flagging to States which do not comply with their obligations.

156. The high value of tuna and the global nature of fleets and markets aggravate concerns about excess fleet capacity and increased risk of overexploitation and stock depletion. In recent years, the World Tuna Purse Seine Organization temporarily limited fishing effort by their vessels in order to decrease the overall supply of fish to increase the price. Moreover, the number of longline vessels has been reduced in some countries. However, such actions are not regarded as sufficient in the long term to control fishing capacity and exploitation. Most RFMOs that manage tuna are attempting to address the issue of tuna fishing capacity in their areas of responsibility, in addition to the management of stocks through catch and fishing effort control. However, the problem of managing tuna fishing capacity is complex, involving biological, socio-economic and technological issues, whereas the conventions of most, if not all of the tuna fishery management organizations do not address the social and economic aspects of fishery management.

157. *RFMOs*. Many RFMOs emphasize that there are clear linkages between fleet overcapacity and IUU fishing, and have expressed concern about the possibility of solving fishing overcapacity problems in one geographical area only to transfer them elsewhere.[73] Some RFMOs report that they have addressed the issue by introducing measures on a regional level.

158. In its resolution C-02-03 (revised), IATTC established a fleet capacity limitation programme, including among other things a regional vessel register. It is prohibited to register new purse-seine vessels unless a vessel of equal or greater capacity is removed.[74] Some specific exceptions are, however, included in the programme for named parties. IATTC is close to finalizing a regional management plan addressing fishing vessel capacity.

159. IOTC has adopted a resolution to limit the numbers and overall tonnage of vessels longer than 24 m,[75] and CCAMLR indicates that there are measures in place restricting the number of vessels in new and exploratory fisheries.

160. NEAFC has pointed out that management of fishing capacity is the responsibility of individual parties. However, conservation measures can have an impact on the management of fishing capacity. In that respect, NEAFC notes that the freeze on effort in fisheries for deep sea species in its regulatory area has had a direct effect on fishing capacity. Furthermore, NAFO and NEAFC require parties to manage their authorized vessels and their fishing effort in a manner commensurate with the fishing opportunities available to that party.[76]

161. *States*. Cambodia,* Canada, the European Community, Norway, Portugal and the United States report that they have assessed their fleet capacity and have already taken actions to address overfishing and excess fishing capacity. In the European Community, capacity management is undertaken through the structural policy of the Common Fisheries Policy. While the policy has historically been concerned with modernizing the fleet through a subsidy programme, more recently it has been redesigned in the light of persistent problems of overexploitation of key stocks, and a new effort-based system has been introduced with stringent regulations on vessel replacement and entry of new vessels. Those new measures are: (a) no further financial aid for the construction of new vessels; (b) no replacement of capacity whose elimination has benefited from financial intervention; and (c) compensation for the entry of new capacity into the fleet without public aid by the withdrawal without public aid of at least the same amount of capacity.[77]

162. Many States, such as Canada, the European Community, Morocco,* Norway, Saudi Arabia* and the United States, underline the fact that their laws and regulations already prohibit overfishing and mandate the adoption of recovery measures for overfished stocks in areas under national jurisdiction, and establish measures to control overcapacity, including the redirection of effort to underexploited fisheries. Kuwait* and Morocco* have frozen investments in the fishing sector and prohibited the issue of new licences, while the Philippines* is implementing a moratorium on the issue of new commercial fishing vessel and gear licences, as part of a precautionary approach to fisheries management.

163. Canada, the European Community, Norway, Pakistan* and the United States have taken measures, such as restrictive licensing, vessel and permit buy-backs, exclusive quota programmes or a combination of all those measures.

164. Norway combines access and quota regimes whereby total allowable catches are distributed annually among qualified vessels, including quotas for individual vessels. It has also established a quota transfer system, which allows for merging quotas determined by the removal of capacity from the particular fishery.[78] The result has been a significant reduction in numbers of large fishing vessels, and the system will now be expanded to include the small vessels of the coastal fleet.

165. Canada reports that comprehensive measures have been implemented through a specific programme to help maintain a balance between fishing capacity and available resources.[79] In the past, when over capacity problems arose, a series of aggressive policy and programme interventions were implemented, including a licence buy-back and early retirement programmes, coupled with retraining and economic diversification measures to assist the affected workers and communities with their transition out of fisheries. Canada uses several different strategies for capacity management. Limiting entry to the fisheries is the most widely used strategy, in addition to input control measures, such as gear and area restrictions. There are also vessel replacement rules specific to each fishery to control capacity growth. Canada, whose number of commercial fishing vessels fell by 31 per cent from 1992 to 2002, has seen a reduction in capacity of every fleet where individual quota and enterprise allocations were introduced.

166. The United States indicates that it has completed national plans of action for the management of fishing capacity. New Zealand states that it does not intend to develop such plans, as its fisheries are managed through a quota management system. It does not use capacity controls, relying instead on output controls to

ensure catches are kept within sustainable limits. Under that system, quota holders are free to determine the appropriate level of capacity they require to harvest their quotas.

3. Effects of fishing on the marine environment

167. Fishing activities can affect the functioning and state of marine ecosystems. Overexploitation of fishery resources, IUU fishing, the use of non-selective fishing gear and destructive fishing practices and techniques aggravate the effects of fishing on ecosystems. Marine ecosystems, including fishery resources, are also affected by other human activities and environmental factors.

168. The general principles in article 5 of the Agreement, inter alia, promote the protection of marine ecosystems and of biodiversity in the marine environment. In particular, States are called upon to minimize pollution, waste, discards, catch by lost or abandoned gear; catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species, in particular endangered species, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques. In the context of the application of the precautionary approach, articles 5 (d)-(g) and article 6 (3) (d) of the Agreement also promote the development of data collection and research programmes to assess the impact of fishing on non-target and associated or dependent species and their environment and the adoption of plans to ensure the conservation of such species and to protect habitats of special concern. The following paragraphs provide information on actions taken by RFMOs and States to implement the provisions of the Agreement (see also A/60/189).

(a) Ecosystem approach to fisheries management

169. The ecosystem approach is another management tool that can enhance sustainable fisheries. Its use is prescribed by the Agreement and recommended by the 1995 FAO Code of Conduct for Responsible Fisheries and the World Summit on Sustainable Development Plan of Implementation. In 2001, the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem enunciated general principles for the incorporation of ecosystem considerations into fisheries management. Furthermore in 2003, FAO developed technical guidelines on the ecosystem approach to fisheries.[80]

170. *RFMOs*. A number of RFMOs, such as CCAMLR, IATTC, NEAFC, SEAFO and WCPFC, have incorporated the ecosystem approach into regulatory measures for the conservation and management of marine living resources in their convention areas. CCSBT, ICCAT, IOTC and NAFO are moving in that direction.

171. In line with article 2 of its Convention, CCAMLR fully incorporates an ecosystem approach into its management regime. The aim is not only to regulate fishing for certain species, but also to ensure that fishing does not adversely impact other species that are related to, or dependent on, the target species. For example, CCAMLR seeks to preserve the "health" of the ecosystem by setting conservative (that is, precautionary) krill catch limits to take account of the needs of associated species in a manner which preserves the ecological sustainability of all the species concerned.

172. CCSBT has created a special advisory group on ecologically related matters, with the mandate to reduce by-catch and evaluate effects on associated species, and has taken measures to reduce the impact of fishing on ecologically related species and by-catch. For example, all vessels fishing for southern bluefin tuna must use tori poles to mitigate seabird mortality; educational material on seabirds and sharks was disseminated to fishers in the southern bluefin tuna fishery; and members are required to collect data on by-catch species.

173. IATTC has adopted a number of conservation measures on the basis of scientific advice which includes information on ecosystem effects of fishing.[81] Furthermore, the Antigua Convention, which was adopted in 2003 to strengthen the IATTC, implements the provisions of the Agreement concerning the adoption of measures for species belonging to the same ecosystem or associated with or dependent upon the target stocks; the adoption of measures to minimize waste, discards, catch by lost or abandoned gear, catch of non-target species and impacts on associated or dependent species, in particular endangered species.

174. ICCAT has adopted resolutions calling for the monitoring of interactions between ICCAT fisheries and pelagic sharks, seabirds and sea turtles. The standing committee on research and statistics has a subcommittee on by-catch and a subcommittee on environment, both of which address issues related to the effects of fishing on the environment. At its 2005 meeting, the Committee recommended that the two subcommittees be merged together into an ecosystems subcommittee.

175. IOTC recognizes the importance of considering the impact of fishing on the ecosystems associated with the target tuna species and established a working party on by-catch which reports to the Commission via the scientific committee. IOTC encourages the participation in its meetings by parties to the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-east Asia, as well as by relevant non-governmental organizations (NGOs).

176. Until now, NAFO has generally managed stocks on an annual stock-by-stock and single species basis. The development by NAFO of an ecosystem-based approach is being discussed, and NAFO scientists are tasked to look into areas of marine biological and ecological significance. In addition, fishing vessels will collect, on a voluntary basis, data on seamounts in the NAFO area.

177. NEAFC has decided to take a broader ecosystem approach to fisheries management. In 2005, NEAFC agreed to pursue the ecosystem approach, the protection of biodiversity and the application of the precautionary approach. NEAFC also cooperates with relevant organizations, including the OSPAR Commission for the Protection of the Marine Environment in the North-east Atlantic and the Inter-organizational Consultation Forum established by the Directorate-General for the Environment of the European Commission to coordinate work on the management and protection of the marine environment in European waters. In 2004, NEAFC closed to fishing activities five seamounts on the high seas to protect vulnerable deep-water habitats.

178. WCPFC is dedicating specific attention to issues relating to biodiversity, including non-target and associated species. Two fisheries-related regional organizations in the Pacific Islands region, SPC and FFA, have recently received funding through the Global Environment Facility (GEF) to work on, among other

things, impacts of fisheries on deep-sea benthic ecosystems in the convention area, in particular on seamounts. WCPFC will follow that research closely, and in 2006 SPC will be contracted as the provider of scientific advice to WCPFC.

179. *States*. Several States, such as Canada, the European Community, Kuwait,* Myanmar,* New Zealand, Norway, the Philippines,* Portugal, Qatar* and the United States have initiated implementation of an ecosystem approach to fisheries management, by adopting fisheries legislation that incorporates strong environmental obligations. New Zealand indicates that the application of an ecosystem approach, including the impact of fishing on ecosystems, has also been incorporated into the annual decision-making process on catch limits and fishing practices. The European Community is applying ecosystem considerations to the management of fisheries in the North Sea and the Baltic Sea and has requested ICES to give scientific information for those areas. Some States further advise that they are in the process of developing either a draft fisheries law that would incorporate ecosystem considerations in their management of fisheries, a strategy for managing the environmental effects of fishing activities or a set of guidelines for the implementation of the ecosystem approach to all anthropogenic activities in the marine environment, including fishing activities.[82]

(b) Fisheries by-catch and discards

180. *RFMOs*. Within RFMOs, CCAMLR has adopted seabird by-catch mitigation measures,[83] as well as other measures on mesh size regulation, a bottom trawl prohibition around South Georgia and by-catch limits for several elasmobranch species. By-catch issues are considered by the Working Group on Fish Stock Assessment and the Working Group on Incidental Mortality Associated with Fishing.

181. In 2004, the IATTC adopted a comprehensive resolution on by-catch designed to reduce the by-catch of juvenile tunas and non-target species, including dolphins, turtles, seabirds and sharks, and the release of unharmed non-target species.[84] AIDCP, which came into force in 1999, provides measures to mitigate the effect of purse-seining on dolphin stocks.

182. ICCAT has adopted recommendations on minimum size and time/area closure for several species (yellowfin tuna, bigeye tuna, bluefin tuna and swordfish) and measures to encourage the release of live discards of billfish and bluefin tuna. The use of driftnets is prohibited in the Mediterranean and discouraged throughout the Convention area.[85] ICCAT encourages the submission of by-catch and interaction statistics as well as the development of national action plans for sharks and seabirds.

183. IOTC has not yet established sampling requirements for by-catch and the By-catch Working Group, established in 2002, has only recently released a work plan to address the issue. In 2005 IOTC adopted a resolution on the conservation of sharks caught in association with fisheries managed by IOTC.[86] Recommendations on sea turtles and on incidental mortality of seabirds were also adopted.[87]

184. NAFO has in place a number of regulations to diminish by-catch, including gear and fish size requirements, and area and time restrictions and by-catch requirements obliging fishing vessels to stop fishing and move location when a certain proportion of by-catch species has been reached.[88] Discards have to be recorded in the logbook and are reported by observers.

185. NEAFC has adopted measures to mitigate the incidental catch of juvenile haddock in particular areas of Rockall Bank, which have been closed to demersal fishing gear. In the case of deep-sea fisheries, NEAFC is also addressing problems relating to non-target species and discards.

186. *States*. Belize, the European Community, Myanmar,* Morocco,* New Zealand, Norway, Pakistan,* the Philippines,* Portugal, Qatar,* Saudi Arabia,* Serbia and Montenegro,* the United Kingdom and the United States report that they have taken technical measures to minimize the catch of non-target species. Croatia,* the European Community, Morocco,* New Zealand, Norway, Pakistan,* Philippines, Portugal, Saudi Arabia,* Serbia and Montenegro,* the United Kingdom and the United States took measures, including the adoption of bans on the discard of by-catches of commercially important fish species, the use of mesh size limitations, bans on landings of juveniles, gear restrictions, minimum catch size and seasonal and area closures of fishing grounds to limit by-catch (juveniles, non-target species and non-fish species) and discards. Morocco* and the United States report that the permitted levels of by-catch and/or discards have been developed in consultation with the industry. In addition, some States make use of tighter controls to limit by-catch and discards, including vessel restrictions for some areas, as implemented by New Zealand, Norway and the United Kingdom, and prohibition of discarding, a ban imposed by New Zealand, Norway and Pakistan.* Croatia* uses fixed quotas of by-catch and New Zealand uses administrative penalties when the annual quota of by-catches exceeds the quota allowed under the total allowable catches. The use of selective fishing techniques, through financial incentives, and the funding of studies on by-catch and possible mitigation measures have also been promoted.[89]

187. Detailed information on national legislation and action on by-catch was provided by the United States. The Sustainable Fisheries Act adopted by the United States in 1996 provides a legal definition of by-catch as fish harvested in a fishery but not sold or kept for personal use and creates National Standard 9, which states that "conservation and management measures shall, to the extent practicable, minimize by-catch and, to the extent by-catch cannot be avoided, minimize mortality of such by-catch." Moreover, a national by-catch plan entitled "Managing the Nation's By-catch: Priorities, Programmes and Actions for the National Marine Fisheries Service" was developed on the basis of information stemming from a series of workshops aimed, inter alia, at increasing industry and public understanding of by-catch issues.

188. Some States have developed mechanisms for communicating information on areas of concentration of juvenile fish. The United States operates an observer information programme that provides trawl fishing fleets operating off the north-west coast with accurate information on concentrations of juvenile fish, to help the fleets to comply with stringent by-catch regulations associated with the fisheries. Morocco* and the United Kingdom indicate that similar mechanisms in their countries play an important role in providing information on concentrations of juveniles to their fishing fleets.

189. Belize, Croatia,* the European Community, Kuwait,* Myanmar,* New Zealand, the Philippines,* Portugal, Qatar,* Saudi Arabia,* Serbia and Montenegro* and the United States indicate that they support studies and research aimed at reducing or eliminating the by-catch of juvenile fish. Kuwait,* Myanmar,* Norway and the United States are conducting research programmes aimed specifically at the

development of gear modifications to improve selectivity of gear, and the European Community and France are researching how to minimize cetacean mortality.

190. Several States point out that they perform their duty to conserve non-target species taken incidentally in fishing operations by cooperating within subregional and regional organizations; the IOSEA Marine Turtle memorandum of understanding; the Inter-American Convention for the Protection and Conservation of Sea Turtles and their Habitats; the Convention on the Conservation of Migratory Species of Wild Animals; the Agreement on the Conservation of Small Cetaceans of the Baltic Sea and the North Sea; the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area; and the Agreement on the Conservation of Albatrosses and Petrels.

(c) Marine debris and other sources of pollution and waste

191. *RFMOs*. Measures adopted by RFMOs include promotion by CCAMLR of compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL), in particular its annex V.[90] CCAMLR members report annually on both the incidence of marine debris encountered in the Convention area and its impact, including entanglements, on marine mammals and seabirds.

192. IATTC addressed the issue of lost or abandoned fishing gear and related marine debris in its resolution C-04-05 on by-catches, by prohibiting vessels from disposing of salt bags or any other type of plastic trash at sea.

193. *States*. Several States report that they have addressed (Croatia,* Morocco,* New Zealand, Norway, Pakistan,* Philippines,* Qatar,* Saudi Arabia,* the United States and Venezuela (Bolivarian Republic of)*) or are in the process of addressing (The European Community, New Zealand and Pakistan*) the issue of lost or abandoned fishing gear and related marine debris. The United States has established an inter-agency marine debris coordinating committee to allow consideration of the issue from all sectors and sources. The European Community funds operators' initiatives to recover lost gears and compilation of all information required to initiate a programme of recovery of lost gear, while Pakistan* has introduced a monitoring system to collect data on gear loss, economic costs to fisheries and impact on other sectors and on marine ecosystems.

194. Systems to retrieve lost gears and nets have been adopted by several States. In the United States, federal agencies and private sector groups have been removing derelict fishing gear from coral reefs and beaches in the north-west Hawaiian Islands. They locate derelict gear by using a tow board method[91] and geographically referencing it with the Global Positioning System. Two major efforts have also been undertaken in the North-west Straits and in the Gulf of Mexico. In addition, the United States is initiating a new programme to assess the feasibility of a port reception facility for spent and derelict fishing gear. In New Zealand, regional councils are responsible for cleaning up gear washed ashore. Norway has, since the early 1980s, undertaken annual cruises in particular areas to collect lost gill nets and has retrieved about 500 gears a year using specifically designed trawls. Other States indicate that retrieving lost gear and nets is done by environmentalists and fishermen themselves (Myanmar,* Pakistan* and the Philippines*) or by the fishery enforcement authorities (Qatar,* Saudi Arabia* and Venezuela (Bolivarian Republic of)*).

195. Cyprus, the European Community and Norway have taken action to minimize other sources of pollution and waste that includes the adoption of measures forbidding the disposal at sea of any substance or object which would cause negative effects on the reproduction, development, survival or exploitation of marine living resources. The European Community has measures to eliminate priority hazardous substances and achieve concentrations in the marine environment near background values for naturally occurring substances. Norwegian measures include a ban on production and/or systems to reduce discharges for several persistent organic pollutants, close monitoring of levels of other substances that are liable to bio-accumulate and close attention to the issue of releases of radioactive substances into the environment from domestic sources like hospitals and inputs from overseas sources. Cyprus participates in regional monitoring programmes for the assessment of heavy metals, pesticides and effluents discharged into the sea from land-based sources.

196. A number of States indicate that they are parties to international instruments dealing with marine pollution, or are about to become parties, including MARPOL 73/78, in particular its annex V.[92] The European Community and New Zealand report that they have taken measures to implement the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities and other relevant international instruments aimed at abating pollution from land-based sources. In that regard, the European Community points out that it is also a party to other regional conventions, such as the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution, the Convention on the Protection of the Marine Environment of the Baltic Sea Area and the OSPAR Convention.

(d) Conservation of marine biodiversity

197. Measures adopted by States for the conservation of marine biodiversity include restrictions and prohibitions in relation to fishing and other marine harvesting activities deemed to affect endangered species and habitats, prohibitions relating to specific harmful practices, such as the use of trawls in certain areas, the use of explosives and harmful or poisonous substances for fishing purposes and general measures for the conservation and sustainable use of biological diversity.[93] Relevant international efforts in the field include those by the European Community and Norway aimed at the implementation of the Convention on Biological Diversity and the work of FAO to apply the ecosystem-based approach. The European Community is preparing guidelines for the implementation of the ecosystem approach in the management of all human activities, including fishing, that affect the marine environment.

198. The opening and closing of fishing areas according to conservation needs remains a critical feature of a regulatory system operating on an ecosystems perspective. Systems of marine protected areas, where fishing is restricted or prohibited, are also being established in vulnerable ecosystems by Canada, through the Oceans Act and Federal Marine Protected Areas Strategy, and Norway. Cyprus is carrying out research projects focusing on the development of marine protected areas.

(e) Data collection and research programmes on marine ecosystems

199. *RFMOs*. CCAMLR promotes research in relation to both target and non-target species. Biological information on target species relates mainly to the growth, reproduction and natural mortality of the species being harvested. It is collected by research vessels and on commercial fishing vessels by their crews and by national or international observers. The ecosystem monitoring programme aims to detect and record significant changes in selected stocks of species that depend on, or are related to, targeted species, in order to distinguish between changes arising directly from harvesting and those which occur naturally as a result of physical or biological variability in the environment.

200. The Advisory Committee on Fishery Management of ICES is responsible for providing scientific information and advice on living marine resources, their harvesting and the interaction between fisheries and ecosystems to NEAFC, the International Baltic Sea Fisheries Commission, the North Atlantic Salmon Conservation Organization and the European Community. Among the issues addressed, described in the ICES annual report for 2004, in the context of the work of the Council on the sustainable use of living marine resources, are the modelling of marine ecosystems and their exploitation, as well as the life history, dynamics and exploitation of living marine resources.

201. *States*. Canada, Croatia,* Morocco,* Myanmar,* Norway, the United Kingdom and the United States report that they are conducting scientific research and studies to improve the knowledge basis for addressing the relationship between fisheries and wider ecosystems and to increase knowledge on single-stock, multi-species and ecosystems levels. The United States is conducting research on the development of strong indicators of the status of ecosystems and the establishment of an integrated and comprehensive ocean observing system. The European Community is addressing several issues with regard to (a) a better understanding of the boundaries, structure and dynamics of marine ecosystems, (b) the response of those ecosystems to human activities, with a special emphasis on fishing, and how that response may be monitored by appropriate indicators and (c) the study of biological interactions of small groups of fish stocks and the forecasting of the effects of fishing when considering such interactions. In the context of preparation of its seventh framework programme of research (2007-2011), the European Community is also giving consideration to the establishment of "centres of excellence" in order to improve both scientific personnel and infrastructure. The Norwegian Institute of Marine Research has been reorganized to work on the basis of three ecosystem programmes that cover the Barents Sea, the Norwegian Sea and the North Sea and to facilitate interdisciplinary research into large ecosystems.

4. Collection and sharing of fisheries data

202. Article 5 (j) of the Agreement requires parties to collect, share and complete accurate data concerning fishing activities on, inter alia, vessel position, catch and fishing effort, as set out in annex I, as well as information from national and international research programmes. Furthermore, article 14 sets out criteria for the collection and provision of such information, both individually or through RFMOs, and for cooperation in scientific research. As for the stocks concerned, it is clear that most data collection and sharing is carried out under the auspices of scientific bodies of relevant RFMOs or international institutions providing advice to RFMOs.

Such bodies are, however, dependent on data provided by national scientists and institutions. In the present report the focus will be on data collection and sharing through RFMOs.

203. *RFMOs*. Some RFMOs have signed partnership agreements with the Fisheries Resources Monitoring System, a global aquatic resource monitoring system, comprising core information modules on species, resources, fisheries and fisheries management systems. The information is published through FIGIS, a web-based information and management tool operated by FAO. Its main objective is to raise awareness of policy issues relating to fisheries and their environment, to promote standards and improved practices in the conduct of fisheries and fisheries-related activities and to provide comprehensive and coherent fisheries information.

204. Although international cooperation in the collection and sharing of data for the stocks concerned is done mainly through RFMOs, some scientific bodies are also important. For example, ICES coordinates and promotes marine research in the North Atlantic. Since its establishment in 1902, ICES has been a leading scientific forum for the exchange of information and ideas on the sea and its living resources, and for the promotion and coordination of marine research by scientists within its 19 member countries from both sides of the Atlantic.[94] There is also the North Pacific Marine Science Organization, an intergovernmental scientific organization established in 1992 to promote and coordinate marine research in the northern North Pacific and adjacent areas. It currently has six member States.[95]

205. CCAMLR collects data from fishery catch, effort statistics and data collected by scientific observers on fish by-catch and incidental mortality of seabirds and marine mammals. CCAMLR also uses landing information obtained by the catch documentation scheme, including trade statistics. The CCAMLR scheme of international scientific observation requires full coverage of all fisheries, except krill, by independent scientific observers. Data collected using a standard format are submitted directly to the CCAMLR database to be used by the Scientific Committee and its working groups. Further biological information and biomass estimates are obtained during fishery-independent scientific surveys. Biological information on dependent species is also collected as part of the ecosystem monitoring programme of the Commission. A centralized VMS was established in the CCAMLR secretariat in 2004 and parties are required to report positions of their flag vessels operating in finfish fisheries inside the Convention area. In 2003 the rules for access to data were revised. The underlying principle was retained and the conditions under which data may be exchanged within or used outside the CCAMLR area were clarified. Access to and use of catch documentation scheme and VMS data were also considered; those data may be released to CCAMLR members only under restricted circumstances.

206. CCSBT members provide the Commission with scientific information, catch and effort statistics and other data relevant to conservation of the southern bluefin tuna and ecologically related species. The members are required to collect an agreed data set. CCSBT has agreed to observer programme standards which parties must implement for fleets that catch southern bluefin tuna. The standards have target observer coverage of 10 per cent and data sets must be collected. Currently, observer data is maintained by the parties. The secretariat is implementing a five-year tagging programme and maintains a database on tag releases and recoveries. A statistical document programme has been established and summaries are now

published on the CCSBT website and are updated on a six monthly basis. The programme has also been modified to incorporate minimum standards that specify the responsibilities of exporters, importers and the CCSBT secretariat in relation to the completion of documents and the action required in response to missing or inaccurate information. CCSBT has cooperated with FAO in the development of the Fishery Resources Monitoring System. It signed the System partnership agreement in late 2003 and submitted a global southern bluefin tuna fact sheet[96] and nominal catch data to FIGIS in late 2004. Most of the nominal catch data is now available from the CCSBT website.

207. The IATTC scientific staff receives fishery dependent data from vessels, managers and processing facilities. Since 1994 all large purse-seine vessels must carry observers, who submit data on a weekly basis to the secretariat. In accordance with Commission resolution C-04-10, the director is required to report annual catches of species under the IAATC purview by flag and gear type to the parties by 1 June the following year. There is also a tagging programme to collect data on tuna populations. IATTC has changed its main data system, which now readily integrates data from scientific observers or logbook data into analyses, and observer data will be the primary source of catch information. IATTC has entered into a partnership agreement with the Fishery Resources Monitoring System and has identified species and stocks on which it will initially report. Cooperative reporting arrangements have been agreed with SPC for various species. IATTC continues to work with SPC and FFA to pursue the harmonization of data collection standards. IATTC has also modified its document series reporting the status and trends in fisheries, and detailed information and scientific analyses are now presented separately in stock status reports.

208. The ICCAT secretariat receives scientific data (primarily current and complete fishery dependent data) from parties by the end of July prior to the annual meeting.[97] The collection and submission of statistical data is specified in the Convention and reiterated in two resolutions.[98] Tagging data are used for growth rate, movement and abundance estimates. Data assimilation and management is carried out by the ICCAT secretariat, which maintains relational databases. ICCAT has adopted a new data exchange protocol that includes various electronic forms and a framework for reading, validating and integrating all statistical data received. All fishery data compiled by ICCAT are made available through an annual statistical bulletin and through the ICCAT website.

209. Parties of IOTC are subject to mandatory statistical reporting and confidentiality procedures. Stock assessment is peer reviewed through species working parties. The secretariat maintains a stock assessment capability in order to ensure that parties without scientific capabilities have access to relevant information.

210. NAFO collects data via parties, including catch and effort data, VMS, reports from port inspections, at-sea inspections and an observer programme. Since 1998, all vessels fishing in the NAFO area must carry observers, mainly for monitoring and compliance purposes, but some of the data they collect are also used by the Scientific Committee of NAFO. NAFO signed the Fishery Resources Monitoring System partnership agreement in 2004.

211. NEAFC requires parties to report to the secretariat monthly catches of species, split between areas under national jurisdiction and beyond. The secretariat further

receives VMS data, which are shared by all inspecting parties on a real-time basis. After one year, the link to individual vessels is severed and the data can be used for scientific analyses. Following the introduction of management measures for deep sea fisheries, NEAFC adopted specific requirements for parties to report on such fisheries. The data will be made available to ICES. However, in general, scientific and survey data are collected by ICES from national institutions. NEAFC joined the Fishery Resources Monitoring System in 2005.

212. SEAFO has established interim arrangements that came into effect with the entry into force of the Convention in 2003. The arrangements will remain in force until the establishment of a system of observation, inspection, compliance and enforcement. They include the reporting of catch and fishing effort and the collection of scientific data for the support of stock assessment. At its annual meeting in October 2005, SEAFO adopted additional measures, including obligations to carry scientific observers, a mandatory VMS as from April 2006 and a scheme for the collection of information from landings. The main challenge from a scientific perspective is to collect adequate data for the relevant fish stocks, including vulnerable ecosystems, which would enable the Scientific Committee to provide sound advice to the Commission. The Scientific Committee will cooperate with other relevant scientific bodies in the region.[99]

213. The WCPFC Convention contains a direct reference to annex I to the Agreement. Parties are obliged to provide annually to the Commission statistical, biological and other data and information in accordance with that annex. As WCPFC has just become operational, information on the implementation of such obligations is not available.

214. *Electronic exchange of information among RFMOs*. Work is now proceeding on the harmonization of data formats and procedures for international exchange of information by electronic means. NEAFC and NAFO have developed a format and protocols for electronic exchange of fisheries monitoring, inspection and surveillance information: the North Atlantic Format.[100] The format is now also used by CCAMLR and SEAFO. A working group, consisting of members of the FAO Coordinating Working Party on Fishery Statistics and coordinated by NAFO, is tasked with proposing possible amendments to the present North Atlantic Format to ensure its usefulness for assessment and scientific purposes. The FAO Coordinating Working Party on Fishery Statistics provides a mechanism to coordinate fishery statistical programmes of regional fishery bodies and other intergovernmental organizations collecting fishery statistics.

215. *States*. Some States gave comprehensive overviews concerning national programmes and participation in international programmes for marine scientific research in general in the fields of, inter alia, production of hydrographic data, climate, indices, plankton data, sea level data and meteorological data. Although stock assessments should take into account a variety of factors, not all of the information provided seems relevant for assessing the implementation of articles 5, 14 and annex I to the Agreement.

216. Some States described their national scientific institutions and programmes, including domestic coordination of collected data and findings. For example, in Canada there are five core areas of scientific research: aquaculture science; environmental sciences; hydrography; ocean science; and fisheries research. In different regions of Canada resource assessment reviews are conducted

independently, tailored to regional characteristics and stakeholders' needs. A national body, the Canadian Science Advisory secretariat, which coordinates the peer review of scientific issues for the Department of Fisheries and Oceans, facilitates such regional processes, including developing integrated overviews of issues in fish stock dynamics, ocean ecology and use of living aquatic resources.

B. Mechanisms for international cooperation

1. Functioning of RFMOs

217. Part III of the Agreement sets out mechanisms for international cooperation concerning the relevant stocks and identifies RFMOs as the mechanism through which States can fulfil their obligations to manage and conserve them. Many RFMOs were established prior to the conclusion of the Agreement in 1995.[101] As can be seen from the information above, most of these RFMOs have taken specific actions in order to meet some of the new demands and expectations envisaged in the Agreement. The present section reviews to what extent they are fulfilling functions set forth in article 10, such as determining the participatory rights of new members in accordance with article 11, and operating in accordance with the transparency provisions of article 12. In addition, some RFMOs have taken broader approaches, looking into possible shortcomings in their conventions.

218. Article 10 lists criteria which should be adhered to by States through RFMOs. Information provided by the RFMOs concerning the criteria in paragraphs (a) and (c)-(g) have been examined above. The obligations set out in paragraphs (b) and (j) will be dealt with in a separate section: "Fishing allocations". No substantial information has been provided by RFMOs concerning paragraphs (j) and (l)-(m).

219. *Review of mandates by RFMOs.* IATTC indicates that the Agreement was thoroughly addressed during the negotiations for the Antigua Convention, which will replace the IATTC Convention when it enters into force. Many of the provisions of the Agreement are incorporated into the Antigua Convention, such as how it deals with new members, assistance to developing countries, transparency, the precautionary approach, the ecosystem approach, the strengthening of conservation and management functions, the collection and provision of information, cooperation in scientific research, flag State duties, IUU fishing and a number of provisions addressing compliance and enforcement, including port State measures.

220. ICCAT decided in 2005, in its resolution 05-10, that at its annual meeting in 2006, the Commission should review its conservation and management measures taking into account the provisions set out in relevant international fisheries instruments and, following the present review, should develop a work plan to strengthen the organization.

221. NAFO agreed at its annual meeting in 2005 to start a reform process. A working group will meet in April 2006 to examine and recommend changes to the NAFO Convention to reform the decision-making process, to examine the current structure of NAFO and recommend changes to streamline the structure and operation in order to make it a more effective RFMO and to deliberate on any other matter relating to the provisions of the NAFO Convention. The work of the group will include issues related to scientific advice, the precautionary approach,

ecosystem considerations, allocation criteria, compatibility and dispute settlement procedures.

222. NEAFC decided in 2004 to play a more proactive role in addressing overall ocean management and gave a mandate to a working group to look into possible restrictions in the NEAFC Convention and the consequent need for interpretation and/or amendment. Based on the recommendations of the working group, at its annual meeting in 2005 NEAFC adopted amendments to its Convention giving a clearer mandate to pursue the ecosystem approach, protect biodiversity and apply the precautionary approach.[102] At the NEAFC annual meeting in 2005 it was also agreed that a performance review of NEAFC should be undertaken. Assessment criteria and procedures will be developed by a working group that will meet in February 2006.

223. *Monitoring, control, surveillance and enforcement.* Article 10 (h) requires the establishment of appropriate cooperative mechanisms for effective monitoring, control, surveillance and enforcement. All RFMOs have introduced or are about to introduce mandatory VMS for vessels operating within their areas of competence. In 2004, CCAMLR agreed, in conservation measure 10-04, that with the exemption of krill fisheries, VMS data are to be submitted to the secretariat. As from 2005 IATTC requires parties, where possible, to establish VMS.[103] ICCAT adopted a recommendation in 2003 requiring parties to implement VMS no later than 1 July 2005 (later extended to 1 November 2005),[104] while IOTC passed in 2002 a resolution for the establishment of a pilot programme to implement VMS on 10 per cent of fishing vessels.[105] NAFO was the first in the field, as a VMS pilot project had been agreed already in 1996. As from 2002, mandatory VMS have been in place in NAFO, including an obligation to submit VMS data to the secretariat.[106] NEAFC was, however, the first RFMO to establish a fully-fledged VMS, operational as from 1998 which became mandatory for all vessels fishing in the NEAFC area on 1 January 2000.[107] SEAFO agreed in 2005 on a VMS, which will come into effect as from April 2006,[108] and the WCPFC Convention includes specific provisions for the establishment of such a system.[109]

224. Many RFMOs have observer programmes, most of them for the collection of scientific information only. The function of scientific observers under the CCAMLR scheme of international scientific observation is also to report on any irregularities while on board the vessel and on factual data on other vessels sighted in the CCAMLR area.[110] IATTC has adopted a sighting and reporting system concerning vessels operating in its area of competence.[111] In 1998, NAFO established an observer programme, which requires all vessels to carry at least one observer.[112] The duties of the observers include monitoring a vessel's compliance with relevant conservation and management measures and, when an infringement is identified, reporting it within 24 hours to an inspection vessel. Both the South-east Atlantic Fisheries Organization Convention and the Western and Central Pacific Fisheries Commission Convention include observer programme obligations concerning compliance issues,[113] for which the details have not yet been agreed upon.

225. Enforcement of Commission for the Conservation of Antarctic Marine Living Resources measures is undertaken through a system of observation and inspection adopted in 1998. It is a nationally operated system with inspectors designated by the Commission. Results of inspections are reported to the Commission. The North-west Atlantic Fisheries Organization has established a joint inspection and

surveillance scheme,[114] which includes, inter alia, surveillance, boarding and inspection procedures, procedures to deal with infringements and serious infringements, which are treated in different ways and a requirement to follow up on such infringements by the flag State. Serious infringements are to a great extent defined to mean the same as "serious violations" in article 21 (11) of the Agreement. The North-east Atlantic Fisheries Commission adopted a similar joint scheme in 1998,[115] while such schemes are expected to be established in accordance with both the South-east Atlantic Fisheries Organization Convention and the Western and Central Pacific Fisheries Commission Convention.[116]

226. The Commission for the Conservation of Antarctic Marine Living Resources, the Commission for the Conservation of Southern Bluefin Tuna, the Inter-American Tropical Tuna Commission, the Indian Ocean Tuna Commission, the International Commission for the Conservation of Atlantic Tunas, the North-west Atlantic Fisheries Organization and the North-east Atlantic Fisheries Commission have established compliance committees to review, analyse and assess implementation of relevant conservation and management measures and to provide advice in that regard. The International Commission for the Conservation of Atlantic Tunas and the North-west Atlantic Fisheries Organization have special committees dealing with non-contracting party activities, while the others address issues related to such activities in their compliance committees.

227. *Settlement of disputes*. As provided in article 10 (k) of the Agreement, in fulfilling their obligation to cooperate through regional fisheries management organizations, States are required to promote the peaceful settlement of disputes in accordance with Part VIII of the Agreement. Part VIII contains provisions for the peaceful settlement of disputes between States parties to the Agreement. Article 27 of the Agreement provides that all disputes shall be settled by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements or other peaceful means chosen by the parties to the dispute. Article 28 stipulates that States shall cooperate in order to prevent disputes and that States shall agree on efficient and expeditious decision-making procedures within regional fisheries management organizations and shall strengthen existing ones as necessary. Article 29 provides that disputes of a technical nature may be referred to an ad hoc expert panel established by them without resorting to binding procedures for the settlement of disputes. In addition, article 30 provides that the procedures for the settlement of disputes set out in Part XV of the Convention apply mutatis mutandis to any dispute between States parties concerning the interpretation or application of the Agreement, as well as to any dispute concerning the interpretation or application of a subregional, regional or global fisheries agreement relating to straddling fish stocks or highly migratory fish stocks, whether or not they are parties to the Convention. A number of regional fisheries management organizations have specific procedures for the settlement of disputes.

228. In the event of a Commission for the Conservation of Antarctic Marine Living Resources dispute, article XXV of the corresponding Convention sets out that contracting parties must consult among themselves with a view to resolution by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement or other peaceful means. If a dispute is not resolved, it must, with the consent of the parties, be referred to the International Court of Justice, or to arbitration.[117]

229. Article XVI of the Commission for the Conservation of Southern Bluefin Tuna Convention provides for the resolution of disputes, and its annex I includes instructions for creating an arbitral tribunal if other dispute resolution mechanisms fail. Article XXIII of the Indian Ocean Tuna Commission Convention stipulates that if disputes within the Commission are not settled internally, they will be referred for settlement to a conciliation procedure and, if that fails, they may be referred to the International Court of Justice unless the parties to the dispute agree to other methods of settlement.

230. The North-east Atlantic Fisheries Commission agreed in 2004 on a fast track dispute settlement mechanism by amending its Convention and establishing specific procedures for the settlement of disputes, including the voluntarily use of an ad hoc panel if a dispute is not resolved by consultation, negotiation, inquiry, mediation, conciliation, arbitration or judicial settlement. If a dispute is not resolved by the panel's decision, one of the parties may refer it to compulsory procedures, set out in Part XV of the Convention or, for straddling stocks, by the provisions set out in Part VII of the Agreement. The ratification processes are not concluded yet, but North-east Atlantic Fisheries Convention parties have agreed to make use of the mechanism provisionally.

231. Article 24 of the Convention on the Conservation and Management of Fishery Resources in the South-east Atlantic Ocean includes provisions on dispute settlement, which, like those of NEAFC, include an ad hoc panel with the aim of resolving any dispute expeditiously. The references to a possible binding mechanism are also similar to those of NEAFC. In article 31 of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean there is a direct reference to Part VIII of the Agreement, stating that those provisions will apply whether or not parties to the Convention are parties to the Agreement.

232. *Transparency*. Article 12 requires transparency in the decision-making processes and other activities of RFMO. All such organizations have publicly accessible websites, which include meeting minutes, reports and scientific information. Many have amended their rules of procedure for commission meetings or agreed on specific guidelines and criteria for observer status in order to meet the obligations under article 12 (2) of the Agreement. Intergovernmental organizations and NGOs may attend CCAMLR meetings if all members agree. If a member so requests, sessions of the Commission at which a particular agenda item is under consideration are closed to such organizations. CCSBT has established similar, but much more detailed rules, including qualifying criteria for NGOs and time limits for the submission of applications. IATTC meetings may be attended by intergovernmental organizations and NGOs if agreed unanimously by the Commission. The Chair must approve circulation of documents by observers and any oral statements. ICCAT allows for participation by observers, unless one third of the members object in writing 30 days prior to the meetings. NGOs may make oral statements by invitation and distribute documents through the secretariat. IOTC meetings may be attended by intergovernmental organizations and NGOs, which must submit an application 30 days in advance. NAFO amended its rules of procedure in 2002 to facilitate participation by observers, including qualifying criteria for NGOs, time limits for application, evaluation and decision-making procedures.[118] NGOs may make oral statements upon invitation by the Chair and distribute material through the secretariat. NEAFC adopted more or less identical

rules in 2001. The SEAFO and WCPFC Conventions have provisions similar to article 12 of the Agreement.[119] The two organizations agreed on the details at the first meetings of their commissions in 2004. SEAFO agreed to rules similar to those of NAFO and NEAFC, while WCPFC does not set out specific qualification criteria for potential observers.

2. Integrity of RFMOs

233. It is important that States become members of RFMOs that manage marine resources in areas where vessels flying their flags conduct fishing operations and that they participate in the work of such organizations. States emphasize that cooperation within RFMOs not only facilitates conservation and management of fishery resources, but also allows them to exchange relevant fisheries data, as well as information on illegal, unreported and unregulated fishing activities.

234. Several RFMOs have approached non-parties fishing within their area of competence, urging them to accede to their respective conventions or to cooperate with them in conserving and managing stocks under their purview. Some organizations have also introduced the concept of cooperating non-contracting parties. Article 22 of the SEAFO Convention and article 32 of the WCPFC Convention include provisions addressing non-contracting parties. Such States will obtain benefits from participating in the fishery commensurate with their commitment to comply with measures to conserve and manage the relevant stocks.

235. Bulgaria,* Canada, Finland, Greece, Mauritius, the Netherlands, Peru* and Vanuatu* are contracting parties to the Convention on the Conservation of Antarctic Marine Living Resources but not members of the Commission. They are, however, bound to apply all conservation and management measures adopted by the Commission. Furthermore, China,* Seychelles and Singapore* are cooperating with CCAMLR in implementing the catch documentation scheme for Antarctic and Patagonian toothfish. Namibia joined CCAMLR in 2002, while Mauritius and Vanuatu* have applied for membership.

236. Two new members joined CCSBT in recent years: the Republic of Korea* (2001) and Taiwan Province of China* (2002). In 2003, the Commission decided to include the status of cooperating non-members for both the Commission and the Scientific Committee. In adopting the corresponding resolution, members noted that cooperating non-member status was not intended as a permanent arrangement and that cooperating non-members should ultimately accede to the Convention. Currently the Philippines* has that status, while discussions are being held with Indonesia* and South Africa.

237. Recent new members of IATTC are Guatemala* (2000), Peru* (2002) and Spain (2003). The Republic of Korea* has been accepted as a new member, but needs to complete some internal procedures. Canada, China,* the European Community and Honduras* are cooperating non-parties and Taiwan Province of China* is a cooperating fishing entity. The Commission indicates that with the exception of one vessel that does not comply with resolution C-02-03 on capacity restrictions, Colombia* also cooperates with and applies all relevant measures. In addition to the current members of the Commission, Canada, China* and the European Community have signed the Antigua Convention and have indicated that they will become parties when it comes into effect.

238. ICCAT has seen the number of members increase substantially over the last few years. Thirteen States have acceded to the International Convention for the Conservation of Atlantic Tunas since 2000: Barbados in 2000; Algeria* and Honduras* in 2001; Iceland, Mexico* and Vanuatu* in 2002; Turkey* in 2003; Guatemala,* Nicaragua,* Norway, the Philippines* and Senegal in 2004; and Belize* in 2005. Furthermore, the Commission has granted the special status of cooperating non-contracting party or cooperating fishing entity to Guyana,* the Netherlands Antilles and Taiwan Province of China.*

239. Since 2000, seven States have joined IOTC: Oman* in 2000, Comoros* in 2001, the Islamic Republic of Iran and Vanuatu* in 2002, Kenya and the Philippines* in 2004 and Guinea in 2005. The Commission established in 1999 and revised in 2003 the category of cooperating non-contracting party. States wanting that status have to submit an application in advance, indicating their commitment to adhere to all regulations of the Commission. Not all applications have been successful in the past. Currently Indonesia* and South Africa have that status.

240. In contrast, NAFO has in fact seen the number of members decrease over the last few years, mainly owing to the enlargement of the European Community.[120] Romania* has withdrawn from the organization on the ground that it no longer has fishing interests in the region. The organization adopted resolution 1/99, which, among other things, lays down that "new members should be aware that presently and for the foreseeable future, stocks managed by NAFO are fully allocated, and fishing opportunities for new members are likely to be limited" to guide possible future new members with regard to fishing opportunities.

241. The enlargement of the European Community has also had an impact on NEAFC, as Estonia* and Poland* have withdrawn, effective 15 July 2006 and 11 March 2006, respectively. However, the enlargement has had the result that some States previously conducting illegal, unreported and unregulated fishing in the Commission area are now obliged to comply with its measures under European Community regulations. The Commission adopted guidelines in 2003 regarding fishing opportunities for States considering applying for membership, similar to those of NAFO. The Commission has created the status of cooperating non-contracting parties. Quotas have been allocated annually to those States granted the status, that is, Canada, Japan* and New Zealand. Belize has applied for status as a cooperating non-contracting party in order to be involved in trans-shipment operations in the Commission area. The Commission has requested additional information before the application can proceed.

242. At its annual meeting in 2005, SEAFO urged States, in particular signatories to the Convention, to ratify or accede, as appropriate, to the Convention.[121] Those States have been invited to meetings of the Organization as observers, together with States whose vessels are fishing in the SEAFO area. An application from Japan* for the status of cooperating non-contracting party was examined and rejected by the Commission, as parties felt that States fishing in the area should be involved in the decision-making process of SEAFO and that benefits should be matched by obligations, such as contributions to the budget.

3. Fishing allocations

243. The Agreement does not deal specifically with allocation of fishing opportunities. Article 10 (b) provides that in fulfilling their obligations to cooperate

through RFMOs, States shall "agree, as appropriate, on participatory rights such as allocations of allowable catch or levels of fishing effort". There is no guidance in the Agreement itself as to how those rights are to be distributed between parties or as to which criteria are to be used in determining such participatory rights. With respect to new members or participants, however, article 11 of the Agreement sets out detailed criteria for determining participatory rights. Most RFMOs provide guidance in their respective conventions, some more extensive than others, while certain organizations furnish additional criteria in specific guidelines. The information provided by RFMOs does not in all cases specify whether those criteria have been used as a basis for allocation of fishing opportunities.

244. CCSBT has criteria for the allocation of fishing rights set out in its Convention.[122] The Commission indicates that the criteria were reviewed at the annual meeting in 2004 and found still to be valid. In deciding upon allocations, the Commission must consider the interests of parties through whose exclusive economic or fishery zones the stock migrates, the interests of parties whose vessels engage in fishing for the stock, including those historically engaged in such fishing and those which have such fisheries under development, and the contribution of each party to conservation and enhancement of, and scientific research on, the stock.

245. IATTC reports that currently there are two mechanisms for allocating participatory rights, one for the purse-seine fleet[123] and another for catch levels of bigeye tuna taken by longline.[124] With the exception of coastal States, flag States are required to remove existing capacity for purse-seiners before new entrants are permitted, while longliners are limited to the level of longline catch in 2001.

246. In 2001, ICCAT agreed on detailed criteria for allocation of fishing possibilities,[125] including criteria relating to past and present fishing activities, the status of the stocks, the status of the parties and compliance and data submission and scientific research by parties. Some elements from article 11 of the Agreement are included. The criteria have so far not been used. The IOTC initiated work in 2005 to provide the Commission with a comprehensive assessment of management options, including those related to fishing allocations.[126]

247. Article XI.4 of the Convention on Future Multilateral Cooperation in the North-west Atlantic Fisheries includes guidance to the Fisheries Commission which provides that allocation of catches shall take into account traditional fishing by the parties and give special consideration to parties whose coastal communities are primarily dependent on fishing for the stocks concerned and to parties that have undertaken extensive efforts to ensure conservation of the stocks, in particular by providing surveillance and inspection of the fisheries.

248. NEAFC reports that allocations for the major pelagic fisheries are negotiated within groups of coastal States for the stock in question. The result is brought to the Commission and included in the management measures it agrees. When the parties to the Convention on Future Multilateral Cooperation in North-east Atlantic Fisheries negotiated the sharing of the oceanic redfish stock in 1996, for the lack of other guidelines, several of the criteria set out in article 11 of the Agreement were used. Although historical catches were the most important criteria, the respective contributions to the conduct of scientific research on the stock, to conservation and management of the stock and the needs of coastal States whose economies are overwhelmingly dependent on the exploration of living marine resources were also carefully considered.

249. Article 20 of the Convention on the Conservation and Management of Fishery Resources in the South-east Atlantic Ocean contains specific provisions for determining the nature and extent of participatory rights in fishing opportunities, which include the criteria listed in article 11 of the Agreement. In addition, parties to the Convention must consider the interests of developing States in whose areas of national jurisdiction the stocks also occur, and contributions to new and exploratory fisheries, taking into account the principles set out in article 6 (6) of the Agreement.

4. Fisheries not regulated by an RFMO

250. The European Community, New Zealand, Norway, Pakistan,* Qatar* and the United States indicate that they encourage RFMOs of which they are members to adopt conservation and management measures for fish stocks that fall within their competence but are not managed by them. In that regard, the United States refers to its contribution in promoting conservation and management measures for previously unregulated north Atlantic skates and other species in the NAFO regulatory area, and a ban on finning two stocks of Atlantic pelagic sharks in the area of competence of the International Commission for the Conservation of Atlantic Tunas. The European Community points out that in the case of unregulated species in the NAFO area, the difficulty is not so much reaching a consensus on the principle of regulating unregulated stocks, but rather agreeing on the individual allocation within the catch limits for such stocks.

251. In addition, some RFMOs state that they have taken measures to expand their management coverage to other species. NAFO advises that in 2004 it added three stocks, namely redfish, white hake and skate, to its quota table and in 2005 it adopted a ban on shark finning. NEAFC indicates that in 2002 it extended its regime to species inhabiting deep waters. However, lack of data and information about the state of those stocks hamper progress in establishing conservation measures. CCAMLR points out that its current conservation measures adequately cover the establishment and development of all new and exploratory fisheries.

252. New Zealand reports that it is a party to the Arrangement between Australia and New Zealand for the Conservation and Management of Orange Roughy on the South Tasman Rise, which establishes measures for the conservation and management of orange roughy in that area. While the Arrangement was agreed in 2000 between Australia and New Zealand, which are now the only parties, any other country with a real interest in its objective is entitled to join. The arrangement requires members to license vessels to trawl or carry out other demersal fishing for any species in the area, to carry out scientific research, to exchange information and to establish a process for setting catch limits and allocating quotas.

253. In the north-east Atlantic, the three major pelagic fish stocks (blue whiting, mackerel and Norwegian spring-spawning (Atlanto-Scandian) herring) straddle several EEZs and high seas areas. They are regulated annually through coastal States arrangements, which are followed by the establishment of compatible measures by NEAFC for areas beyond the national jurisdiction of the coastal States. Management regimes for high seas areas must therefore await the outcomes of negotiations between the relevant coastal States, implying that if the coastal States fail to agree, the Commission does not regulate the stocks concerned. That has been the case for two stocks in recent years. In December 2005 the relevant coastal States reached an agreement for one of those stocks, leaving one still unregulated owing to

disagreement concerning allocation of shares. Some coastal States have, however, entered into bilateral arrangements, while others have set autonomous quotas. Those arrangements and unilateral actions have been within the agreed long-term management plans for the stocks concerned, as described above.

5. Establishment of new RFMOs

254. Many States are involved in processes for the establishment of new RFMOs, or appropriate arrangements for the conservation and management of straddling and highly migratory fish stocks. Australia, the Comoros,* the European Community, France, Kenya, Mauritius, Mozambique,* New Zealand, the Republic of Korea,* Maldives, Seychelles, Somalia,* South Africa and the United Republic of Tanzania* concluded a draft agreement for the management of straddling and high seas discrete stocks (non-tuna species) in the south Indian Ocean, the South Indian Ocean Fisheries Agreement, concluded in April 2005. The agreement will manage most of the high seas areas north of the CCAMLR area in the Indian Ocean, between the EEZs of the eastern African States and the Australian EEZ. Like other instruments of RFMOs created after the Agreement came into effect (for example SEAFO and WCPFC), the draft agreement incorporates many of its provisions. A diplomatic conference to adopt the agreement is scheduled for the first half of 2006. Interim arrangements are in place concerning data collection and authorization procedures for fishing vessels.

255. There is a gap in the international conservation and management of non-highly migratory fisheries and protection of biodiversity in the marine environment in high seas areas of the south Pacific Ocean, from the easternmost part of the south Indian Ocean through the Pacific towards the EEZs of South American States. Non-highly migratory fisheries in the area are mainly discrete high seas stocks, but some are straddling stocks. A first intergovernmental meeting will be convened in New Zealand in mid-February 2006 to establish a new RFMO with a mandate to manage fish stocks not covered by other RFMOs in the area concerned, consistent with the Convention and the Agreement. It is envisaged that the process will take three to four years. Australia plans to hold a second meeting in August 2006, while Chile is planning to host the third meeting in late 2006 or early 2007.

6. Fishing activities by non-parties

256. Article 17 of the Agreement requires non-members of RFMOs to cooperate, in accordance with the Convention and the Agreement, in conservation and management of the stocks concerned, including to refrain from authorizing their vessels to conduct fishing operations in areas where such organizations have established measures. Members of relevant organizations are requested to exchange information concerning such activities and to take measures to deter them. As described above, most RFMOs have in place arrangements for non-parties cooperating with the organizations in question. The present section examines measures established to deter activities by non-parties without that status.

257. Concerning the magnitude of fishing activities by such non-parties, several RFMOs point out that estimates are subject to uncertainties owing to illegal, unreported and unregulated fishing, which cannot be estimated accurately. Although fishing by non-parties has decreased in the CCAMLR area recently, it still constitutes a major problem, and the Commission puts considerable effort into

deterring such activities. In the 2004-2005 season, it was estimated that about 20 per cent of the total catch of Patagonian and Antarctic toothfish came from illegal, unreported and unregulated fishing. In fact some of those illegal, unreported and unregulated catches came from vessels flying the flag of Commission for the Conservation of Antarctic Marine Living Resources members, but the non-member vessels accounted for the vast majority of the catch. CCSBT indicates that currently there are eight flag States involved in the fishery for southern bluefin tuna, of which six have a legal status with the Commission. IATTC reports that of the catch by non-parties, almost all was fished by cooperating non-parties or fishing entities and Colombia.* ICCAT indicates that the statistics for recent years suggest that 5 per cent of the catch of Atlantic tunas in the Atlantic may be attributed to non-parties that do not have cooperating status, while the estimate of IOTC is that less than 10 per cent of the total catch of the four major tuna species derives from fishing activities outside Commission arrangements. NAFO states that in 2004 and 2005, from six to eight non-party vessels were sighted fishing in the regulatory area, mainly targeting redfish. The same vessels have been sighted in the NEAFC area.

258. In order to address the problem of fishing activities by non-parties, some regional fisheries management organizations have established so-called negative lists. CCAMLR was the first to adopt a scheme to promote compliance with its conservation measures by non-contracting party vessels.[127] The scheme sets out procedures for the establishment and maintenance of lists of fishing vessels (illegal, unreported and unregulated vessel list) found to have engaged in fishing activities in the Southern Ocean in a manner that has diminished the effectiveness of Commission measures. Furthermore, CCAMLR members agreed to take appropriate domestic action against vessels appearing on the illegal, unreported and unregulated vessel list, such as the refusal to register and to authorize landing or trans-shipment in ports. IATTC, ICCAT, IOTC, NAFO and NEAFC later established similar systems.[128] Many of the vessels appearing on the illegal, unreported and unregulated vessel lists are of unknown registry, but some flag States are identified and thus included in lists adopted by the respective RFMOs.[129]

259. Illegal, unreported and unregulated fishing vessels could, however, be allowed into legitimate fishing by changing flag and/or ownership. Norway is going further by targeting the illegal, unreported and unregulated fishing vessel itself and taking specific measures against it even when not operated by those who participated in the illegal, unreported and unregulated fishing. That implies that all vessels on a negative list established by a regional fisheries management organization are permanently prohibited from fishing in the Norwegian EEZ and will not be entitled to fly its flag, irrespective of changes in ownership.

260. RFMOs that manage highly migratory species have established so-called positive lists. In 2002, ICCAT was the first RFMO to adopt a measure concerning the establishment of a record of large fishing vessels authorized to operate in the Convention area, a so-called positive list.[130] Only vessels appearing on the list are regarded as fishing in conformity with applicable Commission measures. The record is maintained by the Commission secretariat based on information submitted by parties, cooperating non-contracting parties or a fishing entity. Vessels not in the record are deemed not to be authorized to fish for, retain on board, trans-ship or land tuna and tuna-like species. The measure puts a number of obligations on the parties concerning their vessels that are included in the record. Members of the Commission must take measures, under their applicable legislation, to prohibit,

among other things, the trans-shipment and landing of tuna and tuna-like species by large fishing vessels that are not in the Commission record. CCSBT, IATTC and IOTC have adopted similar measures.[131]

261. Many RFMOs have started refusing to allow the landing of catches resulting from illegal, unreported and unregulated fishing. A direct reference to such actions is also set out in article 23 (3) of the Agreement. Such measures can be taken by any State individually and do not require collective action. Such measures are also included in schemes targeting non-party vessels engaged in fishing activities in the areas of competence of a particular RFMO. It is presumed that a non-party vessel observed fishing in that area is undermining applicable conservation and management measures. Such vessels must be inspected before they are allowed to unload. No landings or trans-shipments are permitted in the port of a party unless vessels can establish that the fish were caught outside the area of application or in conformity with relevant conservation and management measures in force. The master of the vessel may, however, rebut the presumption of illegal, unreported and unregulated fishing.

262. A new approach was taken by CCAMLR in 2002. Rather than searching for the genuine link between the flag State and a fishing vessel flying its flag, the Commission examined ways to bypass the problems with the traditional definition of "flag of convenience". States notorious for having flagged vessels engaged in illegal, unreported and unregulated fishing were identified. Although many illegal, unreported and unregulated fishing vessels tend to fly the flags of States with so-called open registers, in principle States with restricted shipping registers could also be regarded as flags of convenience in a fishing context if it is "convenient" to fly the flag in the CCAMLR area. In order to distinguish between general flag of convenience States/vessels and that new approach, the Commission agreed to use the term "flag of non-compliance". The Commission adopted a resolution on flags of non-compliance implying that contracting parties and non-contracting parties cooperating with the Commission should prohibit landings and trans-shipments of fish and fish products from vessels flying a flag of non-compliance.[132] That implies that all fishing vessels flying a flag of non-compliance would be regarded as illegal, unreported and unregulated fishing vessels when operating in the Commission area.

263. Several RFMOs have developed and implemented market-related measures aimed at combating activities by non-members operating in contravention of relevant conservation and management measures. CCAMLR has established a catch documentation scheme designed to track the landings and trade flows of toothfish caught in the Commission area and, where possible, in adjacent waters.[133] The objective is to enable the Commission to identify the origin of toothfish entering the markets of all parties to the scheme and help to determine whether the fish are caught in a manner consistent with Commission measures. CCSBT requires a statistical document to be completed for all imports of southern bluefin tuna. Trade documents will not be validated, or imports accepted, from vessels not appearing on the positive list.[134] IATTC has introduced a bigeye tuna statistical documentation programme, which requires all bigeye imported into a party to have a statistical document to be validated by the flag State. Furthermore, the Commission has adopted a resolution concerning the use of trade measures to promote compliance.[135] In 1994 ICCAT was the first RFMO to introduce a statistical documentation programme for Atlantic bluefin tuna, later extended to bigeye tuna and swordfish. The Commission brings multilateral, transparent trade measures to bear on members

undermining the effectiveness of conservation measures. IOTC implemented a statistical documentation scheme for frozen bigeye tuna in 2001. A statistical document and prior authorization are needed for at-sea or in-port trans-shipments.

264. Furthermore, CCAMLR has established a policy to enhance cooperation between the Commission and non-members. A list exists of those non-members implicated in illegal, unreported and unregulated fishing and/or in trade that undermines the effectiveness of the conservation and management measures of the Commission. The Chairman of the Commission writes annually to the States listed, encouraging them to accede to the Convention, to take actions in conformity with the catch documentation scheme, to comply with their obligations as flag States and to take other appropriate actions to deter illegal, unreported and unregulated fishing in the Commission area. The Commission is also developing a specific non-contracting party cooperation enhancement programme, focusing on capacity needs, to tackle illegal, unreported and unregulated fishing in certain States.[136]

265. Other RFMOs, such as NAFO and NEAFC, have sent letters from their respective presidents to Governments involved in illegal, unreported and unregulated fishing, expressing concern about the activity and referring to the management regimes in place, including possible consequences for illegal, unreported and unregulated fishing vessels on their negative lists.

266. Several States have, individually or jointly, sent letters to non-contracting parties involved in illegal, unreported and unregulated fishing, as diplomatic demarches.

C. Monitoring, control and enforcement

1. Implementation of flag State duties

267. Articles 91 to 94 of the Convention provide the legal basis for flag States to exercise effective jurisdiction and control over ships flying their flags, including fishing vessels. At the core of the provisions is the obligation to ensure a genuine link between a fishing vessel and the flag State, a link that makes it possible to exercise effective flag State jurisdiction. Flag State responsibilities concerning fishing vessels on the high seas are spelled out in article 18 of the Agreement, which sets out specific obligations that a State must fulfil before allowing its vessels to conduct fishing operations on the high seas, including in areas under the competence of RFMOs. The essential obligation of the flag State is to ensure that vessels flying its flag comply with conservation and management measures of such organizations and do not undermine their effectiveness. To that end, a flag State should not authorize its vessels to fish on the high seas unless it is able to exercise effectively its responsibilities in respect of such vessels under the Convention and the Agreement, and it is required to take measures to control its vessels fishing on the high seas by means of licences, authorizations or permits and to adopt regulations that include: a ban on unauthorized high seas fishing; the enforcement of the terms of licences or permits; the obligation to carry on board the licence, authorization or permit; and a ban on unauthorized fishing in areas under the national jurisdiction of other States. The flag State must establish a national register of fishing vessels flying its flag authorized to fish on the high seas and provide information to interested States when so requested.

268. *RFMOs*. As outlined above, all RFMOs have agreed to specific and detailed measures that place obligations on flag States, such as the recording and timely reporting of fisheries data and the implementation of observer programmes and inspection and monitoring, control and enforcement schemes, including vessel monitoring systems. Furthermore, some RFMOs have agreed to specific measures for the supervision of trans-shipments, including restricting trans-shipments to parties to the RFMO concerned, and detailed reporting requirements.[137] Article 14 of the SEAFO Convention and article 24 of the WCPFC Convention include specific provisions on flag State duties, which to a considerable extent comprise the elements set out in article 18 of the Agreement. Article 29 and article 3 of annex III to the latter Convention contain provisions on trans-shipment, encouraging it to take place in ports of members and imposing terms and conditions for trans-shipment at sea in the Convention area beyond areas under national jurisdiction.

269. *States*. Belize, Canada, Cyprus, the European Community, Kuwait,* Mauritius, Mexico,* Morocco,* New Zealand, Norway, Pakistan,* Portugal, the Republic of Korea,* the United States, the United Kingdom and Uruguay report that they have incorporated article 18 of the Agreement into their domestic legislation. The laws and regulations of Belize, Canada, the European Community, Kuwait,* Morocco,* New Zealand, Norway, Pakistan,* Portugal, the United Kingdom, the United States and Uruguay include requirements for fishing vessels to obtain an authorization, licence or permit from the flag State authorities before they are allowed to engage in high seas fishing. Decisions by New Zealand and the United States to grant authorizations are conditional on the compliance history of the applicant with international fishery regulations and with conditions in the permits or authorizations. In New Zealand authorizations are granted after consultation with the RFMO concerned and in the United States authorization is given only if it is established that the activities proposed would not undermine conservation and management measures. In Norway a licence will be granted only if the vessel will have fishing rights within the area of a regional fisheries management organization of which Norway is a member. The laws and regulations of Canada, Croatia,* the European Community, Morocco,* New Zealand, Norway, the United Kingdom, the United States and Uruguay also provide for the flag State to keep a national record or permit register of vessels authorized to fish on the high seas or, in the case of the European Community, a register of all Community fishing vessels, while member States retain their own national registers of vessels. The European Community explains that while it has the responsibility to incorporate into its laws and regulations all of its obligations under international agreements, member States have to implement the law through the necessary controls over their vessels.[138]

270. Most fishery laws and regulations require operators to mark vessels conducting fishing operations on the high seas, to maintain a logbook and to submit catch and effort reports. Others require that vessels carry on board vessel monitoring systems (such as those of Belize, Canada, the European Community, Croatia,* France, Morocco,* New Zealand, Norway, Pakistan,* Portugal, the United Kingdom, the United States and Uruguay) and/or observers (as is the case of Canada, Morocco,* New Zealand, the United States and Uruguay), as well as implement port inspection requirements (such as the laws and regulations of Canada, the European Community, Morocco,* New Zealand, Norway and Uruguay).

271. Canada, Kuwait,* Morocco,* Myanmar,* New Zealand, Norway, Pakistan,* the United States and Venezuela (Bolivarian Republic of)* report that they exercise

effective control over fishing activities of vessels flying their flags, while Cambodia,* Croatia* and the Philippines* affirm that they are taking measures to improve such control. Those States that exercise control over vessels on the high seas indicate that they either also prohibit trans-shipment at sea or require close monitoring or prior authorization for the practice.

272. New Zealand and the United States report that they have ensured compliance by their vessels with conservation and management measures adopted by RFMOs management organizations of which they are members by providing general information to industry on requirements for fishing on the high seas and specific information on obligations in areas covered by such organizations.

273. Kuwait,* Myanmar,* New Zealand and Venezuela (Bolivarian Republic of)* actively discourage nationals intending to register fishing vessels in non-members of RFMOs identified as undermining their conservation and management measures. For instance, by its 1996 Fisheries Act, New Zealand prohibited its nationals from using a vessel to take or transport fish on the high seas unless the vessel is flying the flag of a "responsible" State. Spain, by Royal Decree No. 1134/2002, has imposed penalties on its nationals working on vessels flying flags of non-compliance. Many States have joined the International Monitoring, Control and Surveillance Network, a global, informal arrangement among national institutions with the objective of improving the efficiency and effectiveness of fisheries-related monitoring, control and surveillance activities, through enhanced cooperation, coordination, information collection and exchange.

2. Use of port State measures

274. Article 23 of the Agreement recognizes the wide discretion of States to exercise jurisdiction over vessels voluntarily present in their ports. The underlying principle formulated in article 23 (1) is "the right and the duty" of a port State to take non-discriminatory measures in accordance with international law, in order to "promote the effectiveness of subregional, regional and global conservation and management measures". Paragraph 2 specifies, inter alia, inspections of documents, fishing gear and catch on board which the port State may carry out on vessels voluntarily in port. It is recognized that emphasis needs to be put not only on the "right" in article 23 of the Agreement, but also on the "duty". FAO has taken the initiative to develop some minimum standards for port State measures.

275. The FAO Committee on Fisheries agreed in March 2005 on an international instrument (a model scheme) that describes basic and minimum port State measures for subsequent implementation through the adoption of regional memorandums of understanding, through RFMOs, or by individual port States. It was emphasized that concerted action at the regional level should be encouraged and that those principles and guidelines did not prevent the adoption of additional and eventually stricter measures. The model scheme includes information to be required by a port State prior to allowing access to a foreign fishing vessel, port inspection procedures, result indicators of port inspections, elements of training programmes for port State inspectors and an outline of an information system on port State inspections. Strong support was expressed in principle for programmes of assistance to facilitate human development and institutional strengthening, including legal assistance, in developing countries to promote the full and effective implementation of port State measures. The FAO Committee on Fisheries also supported the establishment of an

FAO database containing measures that have been adopted by RFMOs and FAO members in implementing port State measures.

276. *RFMOs*. As described above, several RFMOs have adopted market-related measures, such as catch documentation schemes and statistical documentation programmes, requiring specific actions by port States. Those organizations have implicit port State control regimes owing to their resolutions on the establishment of positive vessel lists, according to which members will not allow the import and implicitly also the landing of catch by vessels not on such lists. In addition, many RFMOs have adopted measures targeting activities by non-parties, implying, among other things, the refusal to allow landings of fish caught in violation of applicable regulations.

277. Some RFMOs have established schemes for general port State control, while others have established measures dealing with specific issues. For instance, CCAMLR has agreed to a specific scheme for toothfish, requiring parties to inspect all vessels carrying toothfish entering their ports.[139] A prior notification, including a declaration that they have not been engaged in illegal, unreported and unregulated fishing, must be provided by the vessels. Fishing vessels failing to make such a declaration will be denied port access. If there is evidence that the vessel has fished in contravention of Commission conservation measures, the catch will not be landed or trans-shipped.

278. Port State obligations also derive from established trade measures and the positive lists, which entail some port State obligations. In 1997, ICCAT established a port inspection scheme,[140] which includes some minimum standards in order to monitor landings and trans-shipments, check compliance with Commission management measures, including quotas, and collect data and other information. In 1998, it was agreed to ban landings and trans-shipments of catches by vessels from non-parties identified as having committed a serious infringement.[141]

279. In 2002 IOTC established a programme of inspection in port, instructing members to inspect documents, fishing gear and catch on board fishing vessels in port and to adopt regulations in accordance with international law to prohibit landings and trans-shipments by non-party vessels.[142]

280. NAFO has established measures for port inspection procedures, obliging port States to inspect vessels landing fish from the NAFO Convention area. Such an inspection includes: (*a*) verification of the species and quantities caught; (b) cross-checking with the quantities recorded in logbooks, catch reports on exit and reports of any inspections carried out; and (c) verification of mesh size of nets on board and size of fish retained on board.

281. NEAFC is in the process of developing a comprehensive and harmonized scheme for the north-east Atlantic region, based on the FAO model scheme. SEAFO agreed at its annual meeting in 2005 on an interim Port State Inspection Scheme that requires port States to inspect foreign fishing vessels and transmit information and results to the secretariat of the organization. The interim scheme includes some elements of the FAO model scheme. Parties are considering a fully-fledged scheme, based on the same model, which will be discussed at the annual meeting in 2006.

282. *States*. Many States have, either individually or through their participation in RFMOs, addressed the issue of port State control of foreign fishing vessels calling at their ports. Canada, the European Community, Kuwait,* Morocco,* New Zealand,

Norway, Pakistan,* Portugal, the United Kingdom and the United States report that they carry out inspections when fishing vessels are docked in their ports or at offshore terminals. In the case of Kuwait,* Myanmar,* New Zealand, Norway, Portugal, the United States and Venezuela (Bolivarian Republic of),* should inspections establish that illegal, unreported and unregulated fishing violations have occurred, landings and trans-shipments of catches are prohibited and violations are reported by Kuwait,* Morocco,* Myanmar,* New Zealand, Pakistan, the United States and Venezuela (Bolivarian Republic of)* to the flag State of the vessel and the RFMO or the coastal State where the fishing took place. The European Community, France and Pakistan* agree that enhanced port State control through cooperation among States at the regional level and implementation of the FAO model scheme on port State measures would be important in combating illegal, unreported and unregulated fishing.

283. Norway prohibits the landing of catches originating from illegal, unreported and unregulated fishing.[143] The ban is on landing fish caught in contravention of rules established by RFMOs or other arrangements, including catches taken by nationals of States that are not members of the relevant organization. Such prohibitions apply irrespective of whether the fish has been caught in an area under the jurisdiction of a particular State or on the high seas.

284. Canada has regulations dealing with access by foreign fishing vessels to its waters and ports that take into account the vessels' compliance with relevant conservation and management measures. It grants access to its waters and ports only to fishing vessels from a State with which it has favourable fishery relations. Listed States are those that consistently cooperate with Canada on international fisheries conservation objectives, including sound conservation and management of fish stocks off its coasts.

3. Investigation and penalization

285. Article 19 of the Agreement places a series of obligations on flag States concerning compliance and enforcement, including immediate and full investigation of alleged violations and prompt reporting on the progress and outcome of the investigation to the relevant RFMO, and if a serious violation has been proven, the requirement not to allow the vessel to fish on the high seas until such time as sanctions imposed by the flag State have been complied with. Furthermore, the flag State must ensure that applicable sanctions are adequate in severity to secure compliance and to discourage violations and deprive offenders of the benefits accruing from illegal, unreported and unregulated fishing.

286. As indicated above, CCAMLR, NAFO and NEAFC have established inspection and enforcement schemes, which also include regulations for the response by members whose vessels are alleged to have violated the relevant conservation and management measures.[144] To some extent, those provisions contain elements from article 19 of the Agreement. All three schemes put clear obligations on flag States to institute proceedings, to impose adequate sanctions and to report to the RFMO concerned on developments or conclusions. Actions taken (or not taken) by flag States are examined annually by the respective compliance committees, and the case will remain on the agenda for the committee concerned until it is satisfied with the response by the flag State.

287. Canada, the European Community, Kuwait,* Myanmar,* New Zealand, Norway, Pakistan,* the Philippines,* Portugal and the United States indicate that they have taken action to enforce their own fisheries laws and regulations and to ensure that fishing activities of vessels flying their flag on the high seas and in areas under the jurisdiction of other States are reported, monitored and carried out in a responsible manner. Canada, the European Community, France, Myanmar,* New Zealand, Norway, Pakistan* Portugal and the United States require the use of vessel monitoring systems to monitor fishing activities in areas under their national jurisdiction or to ensure compliance by their vessels with international conservation and management measures.

288. Cambodia,* Canada, Kuwait,* Morocco,* New Zealand and the United States indicate that their legislation provides for severe penalties for fishing violations. Many fisheries laws and regulations provide for aerial and maritime surveillance and other surveillance schemes under the aegis of RFMOs, and impose sanctions for violations of the conservation and management measures of such organizations, including severe penalties and forfeiture of fishing vessels and equipment.

289. Canada, Kuwait,* Morocco,* Myanmar,* New Zealand, the Philippines,* Saudi Arabia* and the United States report that they have developed policies and strategies to address illegal, unreported and unregulated fishing, and the European Community, New Zealand, the United Kingdom and the United States indicate that they have already adopted a national plan of action on that matter. States that have developed policies report that they are often included in their fisheries laws and regulations, or that illegal, unreported and unregulated fishing is often addressed as an integral part of their national fisheries policy. Other States indicate that their policies are being revised in order to conform to their obligations under international law, taking into account the need for harmonization at the regional level through relevant RFMOs. Kuwait,* Morocco,* Myanmar,* New Zealand, Pakistan,* Saudi Arabia* and the United States have carried out awareness campaigns through government agencies or stakeholder organizations to fully inform their nationals of the negative impacts of illegal, unreported and unregulated fishing. Those States have pointed out that their nationals commit an offence under their domestic legislation when they violate fishery laws and regulations of other States (the case of Cambodia,* Morocco,* Myanmar,* New Zealand, Pakistan* and the United States), or when they are found to undermine conservation and management measures of RFMOs (Morocco,* Myanmar,* New Zealand, Pakistan,* the United States and Venezuela (Bolivarian Republic of).*

290. The European Community states that fishing anywhere without a licence, permit, or any other required authorization is a serious infringement of the rules of the Common Fisheries Policy.[145] The United States indicates that it is a violation of its law for persons subject to its jurisdiction to conduct fishing operations in violation of foreign law.[146] Norway reports that it carries out immediate and full investigations of alleged violations of regional conservation and management measures and that profits from such activities are confiscated and fines imposed, including the refusal, withdrawal or suspension of fishing licences.

291. Canada indicates that vessels that fish without a required licence or in breach of their licence conditions are subject to sanctions under Canadian law. Maximum penalties for non-compliance may vary with the offence and range up to 750,000 Canadian dollars plus forfeiture of catch and/or the vessel.

IV. Issues affecting implementation of the Agreement by developing States parties, taking into account Part VII of the Agreement

292. Implementation of the provisions of Part VII, in particular assistance to developing countries for the realization of their rights and fulfilment of their obligations under the Agreement, has been recognized as fundamentally important to the successful implementation of the Agreement as a whole. The lack of/or limited capacity in many developing countries is a serious impediment to the implementation of the Agreement. The Agreement acknowledges the problem and emphasizes the need to build capacity and provide technical assistance to developing countries, including financial assistance, assistance relating to human resource development, technical assistance, transfer of technology and advisory and consultative services. Just a few major programmes of bilateral or multilateral assistance focus specifically on the implementation of the Agreement, although the assistance provided in many cases also helps developing State parties in its implementation.

293. In its resolution 58/14, the General Assembly decided in 2003 to establish the "Assistance Fund under Part VII of the Agreement" (the Fund). The purpose of the Fund is to provide financial assistance to developing States parties in the implementation of the Agreement in accordance with Part VII thereof. Financial support may be sought for: (a) facilitating participation in meetings of regional fisheries management organizations; (b) assisting with travel costs in relevant meetings of global organizations dealing with high seas fisheries; (c) supporting ongoing and future negotiations to establish new related organizations, to renegotiate founding agreements and to strengthen existing organizations; (d) building capacity for effective exercise of flag State duties, monitoring, control and surveillance, data collection and scientific research; (e) facilitating exchange of information and experience on the implementation of the Agreement; (f) assisting with human resources development, technical training and technical assistance in relation to conservation and management of the relevant stocks and development of fisheries for such stocks, consistent with the duty to ensure the proper conservation and management of such stocks; and (g) assisting in meeting costs involved in proceedings for the settlement of disputes.

294. Norway and the United States have contributed 100,000 and 200,000 United States dollars respectively to the Fund. Canada announced that it would contribute 500,000 Canadian dollars over three years to the Fund.

295. Some States report that they are providing assistance to developing States in the conservation and sustainable use of their fishery resources (the case of the European Community, New Zealand, Norway and Portugal) and in fostering cooperation at the regional or subregional level (the case of the European Community, Mexico,* New Zealand, Norway and the United States).

296. The European Community affirms that it assists developing States, in accordance with obligations under Part VII of the Agreement, for the purposes of capacity-building for fisheries management through actions, initiatives and programmes in the framework of bilateral fisheries partnership programmes, the European Development Fund and direct contributions. The European Community supports, through assistance provided by the Fund, a range of activities both at

national and regional level, and is currently financing about 15 fisheries activities in African coastal States, with a total financial envelope of roughly 140 million euros. Key themes are: management of aquatic resources, including monitoring, control and surveillance, and research (stock assessment), sanitary control and artisanal fisheries. The European Community has further voluntarily contributed to two processes for the establishment or reinforcement of regional fisheries management organizations in order to facilitate the participation of developing States, namely SWIOFC and the preparatory conferences of WCPFC.

297. New Zealand supports training and capacity-building for developing countries, including small island developing States, particularly in the Pacific. It has been active in supporting technical assistance and capacity-building in the areas of fisheries legislative framework and monitoring, control and surveillance regimes, including funding of related regional workshops convened by FFA, funding of the Forum itself and participation of Pacific island States in WCPFC meetings. New Zealand has also assisted some Pacific island States by providing fisheries surveillance capacity. In addition, it works with such regional institutions as the secretariat of the Pacific Community and FFA and through other mechanisms to provide assistance to developing Pacific island coastal States to improve the financial returns from fisheries resources in their waters.

298. Norway has provided assistance to several developing countries in Africa through the Nansen Programme, with the long-term objective of self-sufficiency in research and management in partner countries, through the development and strengthening of their institutions. The Programme also carries out field work through surveys with the research vessel "Dr. Fritjof Nansen" and issues basic information on resource abundance and distribution to satisfy immediate management needs. Assistance in collecting, reporting, verifying, exchanging and analysing fisheries data and related information has been provided in North-west Africa, South-west Africa, South-east Africa, in particular Mozambique,* and China.* Norway has assisted Namibia, South Africa and Vietnam* in drafting new fisheries legislation that takes into account the fundamental principles set out in the Agreement. Further financial assistance has been provided for a number of workshops on monitoring, control and surveillance (convened by FAO), and Namibia has received support in establishing such a national system, including training and capacity-building. Norway also provided legal assistance to developing countries in the negotiations to create SWIOFC and to draft SIOFA, as well as technical support to Namibia for the establishment of the SEAFO secretariat.

299. Mexico* indicates that, in conformity with Part VII of the Agreement, it is promoting exchange and cooperation programmes with Central American countries in order to provide assistance to developing States. The Republic of Korea* has provided assistance to developing States through various programmes offered by the Korea International Cooperation Agency. Croatia* reports that although it is working on its own capacity-building, it nonetheless assists developing countries, either directly or through relevant RFMOs. Saudi Arabia* indicates that it contributes to capacity-building for developing countries by contributing to international assistance funds.

300. The United States has provided direct financial assistance to developing States for their participation in WCPFC, as well in improving data collection and sharing

within ICCAT. It is currently exploring opportunities for cooperation in West and North Africa in the areas of fisheries enforcement and management.

301. As mentioned above, in 2005, by its resolution 24/XXIV, CCAMLR developed a non-contracting party cooperation enhancement programme, noting that some non-contracting party States wished to cooperate with the Commission but lacked the capacity to do so and that members would need to commit support and be willing to deliver technical assistance, advice and training to non-contracting parties. In 2006, the Commission will operationalize the programme, including focusing on technical cooperation, flexibility to tailor cooperation on a case-by-case basis, a partnership model, matching of sponsors and recipients and a central repository of information and training material. Furthermore, a priority list of States that may benefit from technical cooperation will be established.

302. CCSBT meets the cost of certain developing States sending observers to its meetings. The Commission has invited Indonesia* to become a cooperating non-member, given financial support for participation in its activities, and has provided assistance to build fisheries administration in relation to southern bluefin tuna. The ICCAT states that the recently adopted Madrid Protocol reduces the financial cost to developing States of being a member and that data and reporting improvement projects are funded by several parties. In addition, funds from special research programmes established by the Commission are often used to provide assistance in data collection and submission. IOTC indicates that there are numerous examples of the Commission having paid due regard to the circumstances and requirements of developing States in the Indian Ocean rim.[147]

303. The SEAFO Convention and the WCPFC Convention contain specific provisions concerning the recognition of special requirements of developing States, including cooperation through financial assistance, assistance relating to human resource development, technical assistance, transfer of technology and activities directed specifically towards improved conservation and management, stock assessment, and scientific research and monitoring, control and surveillance.[148] The WCPFC Convention also requires the Commission to establish a fund to facilitate effective participation of developing States in its work. Article XXXIII of the Antigua Convention provides for measures relating to technical assistance, technology transfer and other forms of cooperation to assist developing States that are members of the Commission to fulfil their obligations under the Convention. In that regard, the Commission has recently conducted a stock assessment training course.

304. FAO states that its Fish Code Programme serves as a principal means for facilitating the implementation of the Code of Conduct for Responsible Fisheries and related international fisheries instruments. Fish Code Programme activities at the national, regional and interregional levels include, inter alia, technical assistance missions, training and human-capacity development, workshops and specialized survey and study missions. During 2004 and the first half of 2005, the Programme has supported a wide range of activities falling under the Code of Conduct thematic areas.

305. FAO has participated in processes for the establishment of several new RFMOs, including WCPFC and the new FAO regional fishery body, SWIOFC. The latter Commission is an advisory body that promotes the sustainable development and utilization of coastal fishery resources off East Africa and several island States

of the region, as well as responsible management and regional cooperation on fisheries policy. The Commission's members include 14 coastal States whose territories are situated wholly or partly within the SWIOFC area of competence. Other States may participate as observers. In addition, FAO has been participating in work on the development of the SIOFA Agreement.

306. GEF indicates that it helps developing countries fund projects and programmes that protect the global environment, including sustainable management of marine living resources, through its projects in the International Waters and Biodiversity focal areas. In the International Waters focal area, 108 countries have received assistance to address marine and coastal issues, of which fisheries is the most important. Assistance also includes the implementation of the Agreement, reduction of by-catch and discards, and responsible fisheries. With particular reference to the African process, GEF is preparing to assist outcomes by funding the establishment of the strategic partnership for sustainable fisheries investment fund for large marine ecosystems of sub-Saharan Africa.

307. The African Development Bank provides funding for many fishery projects in sub-Saharan Africa. Its main areas of assistance focus on strengthening the legal, institutional and managerial capacity of those countries to address conservation and sustainable use of fishery issues.

V. Information on straddling fish stocks and highly migratory fish stocks for which no measures have yet been adopted

308. With the exception of a few species that produce large catches (for example, tunas and swordfish), knowledge of the biology and state of exploitation of highly migratory species (such as billfishes and sailfishes) remains limited. Knowledge is even more limited for most shark species included in annex I to the Convention.

309. Fisheries for highly migratory tuna and tuna-like species as defined in annex I to the Convention, are all under some form of management. However, the global nature of some highly migratory species fishing fleets and of markets make it more difficult for RFMOs to manage fisheries of those species than is the case for more local ones.

310. Unlike fisheries for tuna and tuna-like species, management of fisheries for oceanic sharks and other highly migratory species listed in annex I to the Convention is incomplete. The International Plan of Action for the Conservation and Management of Sharks is a non-binding instrument that should guide management of oceanic sharks, but that does not implement conservation measures. RFMOs that have competence to manage jurisdiction over fisheries that interact with oceanic sharks and other highly migratory species are aware of the by-catch problem, but it is mostly unregulated.

311. Fisheries for pomfrets, sauries and dolphinfish are sometimes included in national fishery management plans, either as a component of the plans for other species or on their own but, generally speaking, a more systematic treatment of those species is necessary before it could be said that the fisheries that exploit them are properly managed.

312. Most fisheries for straddling fish stocks are either managed or in the process of being managed by existing RFMOs or organizations and arrangements that are in the process of being formed.

313. The situation is more variable for fisheries for other high seas fish stocks. While some of them are within the competence of existing bodies, not all are being managed by the organization concerned. In addition, some high seas fish stocks are not covered by any organization or arrangement.

VI. Issues that have prevented some States from becoming party to the Agreement

314. As of 21 December 2005, 55 States and the European Community had ratified/acceded to the Agreement. More ratifications/accessions from coastal States and distant-water fishing nations are needed in order to secure more comprehensive and effective implementation of the Agreement. Although the Agreement may never reach the quasi-universality of adherence achieved by the Convention, since it is not necessarily of direct interest to all States, participation of all key coastal States and high seas fishing States is crucial to ensure wide acceptance of the new approaches to fisheries management it contains.

315. Some States, in particular developing coastal States, have not become parties to the Agreement owing to the misconception that the Agreement addresses the conservation and management of fish stocks on the high seas only and therefore does not have any relevance to the conservation and management of fishery resources in exclusive economic zones. While the Agreement applies to the conservation and management of straddling fish stocks and highly migratory fish stocks beyond national jurisdiction, articles 5 (general principles for the conservation and management of straddling fish stocks and highly migratory fish stocks), 6 (application of the precautionary approach) and 7 (compatibility of conservation and management measures) nevertheless apply to the conservation and management of such stocks in areas under national jurisdiction.[149] Implementation of Part VII of the Agreement and the recent establishment of the Assistance Fund under that Part for the benefit of developing States parties may provide important incentives for those States to consider possible ratification of/accession to the Agreement.

316. More interestingly, some coastal States and high seas fishing States have refrained from becoming parties to the Agreement because of their concerns over specific provisions. Those concerns are not new and were expressed throughout the negotiation on the Agreement during the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks (1993-1995). They are related to the implementation of article 7 on compatibility of conservation and management measures and article 21 on subregional and regional cooperation in enforcement. Some States have reiterated those concerns in their replies to the Secretary-General's request for information on impediments that have prevented States from becoming parties to the Agreement.

A. Compatibility of conservation and management measures

317. Article 7 (1) and (2) of the Agreement provides that, without prejudice to the sovereign rights of coastal States over resources within areas under national jurisdiction, and the rights of all States to fish on the high seas, coastal States and States fishing on the high seas are required to "seek to agree" on the measures necessary for the conservation of straddling fish stocks in the adjacent high seas areas and to cooperate with a view to ensuring conservation and promoting the objective of optimum utilization of highly migratory fish stocks throughout the region, both within and beyond the areas under national jurisdiction. Those measures must be compatible "in order to ensure conservation and management of straddling fish stocks and highly migratory fish stocks in their entirety".

318. In determining those compatible measures, as per article 7 (2) of the Agreement, the following factors need to be considered: (a) coastal States' conservation and management measures for the stocks in their exclusive economic zones in accordance with article 61 of the Convention; (b) agreed high seas measures already established by coastal States and high seas fishing States for the stocks; (c) agreed measures established by RFMOs for the same stocks; (d) the biological unity and other biological characteristics of the stocks concerned and the relationships among the distribution of the stocks, the fisheries and the geographical particularities of the region concerned, including abundance of the stocks in areas under national jurisdiction; (e) the respective dependence of the coastal States and high seas fishing States on the stocks concerned; and (f) the impact of measures on the living marine resources as a whole. Pending the adoption of compatible measures, the Agreement requires States to make every effort "to enter into provisional arrangements of a practical nature", and where they are unable to agree on such arrangements, to resort to the procedures for the settlement of disputes provided under Part VIII of the Agreement.

319. Adoption of compatible conservation and management measures is essential because straddling fish stocks and highly migratory fish stocks may occur simultaneously within and beyond exclusive economic zones or may be available outside at one time and inside at another, with the consequence that amounts taken within areas under national jurisdiction may affect the catches beyond and vice versa. To be effective, conservation measures for the two types of stocks should apply throughout their migratory range, irrespective of the legal regimes applicable to the ocean areas in which the stocks migrate. Measures should therefore be concerned with the whole stock unit in its area of distribution and should be harmonized among all States involved. As far back as 1989, the General Assembly, in its resolution 44/225 on large-pelagic driftnet fishing and its impact on the living marine resources of the world's oceans and seas, noted the serious concern that the "overexploitation of living marine resources of the high seas adjacent to the exclusive economic zones of coastal States is likely to have an adverse impact on the same resources within such zones".

320. While the importance of compatible measures is obvious, modalities for the adoption of such "compatible measures" have raised difficulties for some coastal States and some high seas fishing States. Those two categories of States agree that the measures applied for the two types of stocks in the exclusive economic zone and on the adjacent high seas must be compatible in order to ensure proper conservation and management of the stocks concerned. However, they have fundamentally

different interpretations of the practical implementation of compatible conservation and management measures for straddling fish stocks in the adjacent high seas area and for highly migratory fish stocks throughout the region, both within and beyond areas under national jurisdiction, despite the listing of criteria in the Agreement to assist States in devising such measures.

321. The difficulty of determining compatible measures is compounded by the fact that the exclusive economic zones and the high seas are governed by two distinct legal regimes, where the rights and obligations of all States with respect to the natural resources, including marine living resources are clearly defined (see Parts V and VII, section 2, of the Convention).

322. On the one hand, some coastal States consider that article 116 of the Convention, by subjecting the freedom of fishing on the high seas to, among other constraints, the rights and duties and interests of coastal States provided for, inter alia, in articles 63 (2) and 64, obliges States fishing on the high seas not to jeopardize the interests of coastal States with regard to the conservation and management of straddling fish stocks and highly migratory fish stocks.[150] They believe that in the light of the close relationship between the high seas and the exclusive economic zone, in terms of both biological and ecological interactions, conservation and management measures on the high seas should be adopted by agreement among coastal States and fishing States and need to take into account measures adopted by coastal States in their exclusive economic zones. Therefore, to ensure that coastal States' rights and duties and interests are not ignored, the management regime for straddling fish stocks and highly migratory fish stocks on the high seas should be consistent with the management regime of coastal States with respect to those stocks in their exclusive economic zones, if no consensus can be reached on compatible measures.[151] Those coastal States indicate that implementation of the relevant provisions of the Agreement should not allow conservation and management measures to be taken in the exclusive economic zone without the consent of the coastal State concerned. They also stress that it is necessary to acknowledge fully the preferential status conferred by article 116 of the Convention on coastal States with respect to associated species and their conservation regime, as well as the rights of port States under international law.[152]

323. However, some high seas fishing States have indicated that in implementing compatible measures, conservation measures taken within the exclusive economic zone and those applied in the adjacent high seas for straddling fish stocks and highly migratory fish stocks should be assessed on an equal basis, to ensure that measures complement each other, taking into account scientific evidence,[153] and that a joint management regime based on the scientific assessment of the two types of stocks be established under the joint sponsorship of the States concerned.[154] For such purposes, "due regard" to the needs, interests and practices of both distant-water fishing States and coastal States is the point of departure for discussion on how to establish the fundamental principles of achieving compatibility and coherence.[155] In that respect, they believe that article 7 of the Agreement puts too much weight on the measures adopted by coastal States when it requires such States and high seas fishing States to cooperate in establishing compatible conservation and management measures for the stocks concerned, giving the impression that the Agreement seems to be structured to serve more the interests of coastal States than those of States fishing on the high seas.[156]

B. Subregional and regional cooperation in enforcement

324. The Agreement establishes a cooperative scheme for enforcement of subregional and regional conservation and management measures for straddling fish stocks and highly migratory fish stocks. Article 21 (1) provides that in any high seas area covered by an RFMO, a State party which is a member of such organization or a participant in such arrangement may, through its duly authorized inspectors, board and inspect fishing vessels flying the flag of another State party to the Agreement, whether or not such State party is also a member of the organization, in order to ensure compliance with conservation and management measures for the two types of stocks. Article 21 also lays down that following boarding and inspection, where there are clear grounds for believing that a vessel has violated conservation and management measures, the inspecting State shall secure evidence and notify the flag State. The flag State must respond within three working days and either take action or authorize the inspecting State to investigate. In the latter case, the inspecting State is required to communicate the results of the investigation to the flag State, which must, if evidence so warrants, take enforcement action or authorize the inspecting State to take such enforcement action as the flag State may specify. Article 21 (5)-(8) of the Agreement lays down that where the flag State has failed to respond or take action in case of "serious violation" as defined in article 21 (11) of the Agreement, the inspectors may remain on board for further investigation and, where appropriate, may request the master to bring the fishing vessel to the nearest port. The name of the port must be communicated immediately to the flag State.

325. As a safeguard, article 21 (12) and (18) provides that the decision of the flag State to fulfil its responsibilities under the Agreement supersedes any action taken by an inspecting State with respect to a vessel suspected of having committed a violation and that all States are liable for damage or loss caused to fishing vessels due to unlawful or excessive enforcement actions taken by them. In addition, article 21 (15) provides that members of an RFMO which have established an alternative mechanism within their organization or arrangement that allows them to discharge effectively their obligations under the Agreement may agree to limit the provisions of the boarding and inspection under article 21 (1) as between themselves.

326. In spite of such safeguards, some high seas fishing States, such as Mexico* and the Republic of Korea,* have indicated that they still have difficulties with respect to the provisions of article 21 of the Agreement that deal with subregional and regional cooperation in enforcement. They consider that those provisions constitute a violation of the well-established principle of flag State exclusive jurisdiction over vessels flying their flags on the high seas and could affect the sovereign rights of the flag State, and have stated that that is among the issues preventing them from becoming parties to the Agreement. The Republic of Korea* is of the view that obtrusive inspection of fishing vessels by non-flag States may cause unnecessary inconveniences and impediments to legal fishing activities on the high seas.

327. Non-State parties have indicated that the Review Conference should offer an opportunity to clarify the provisions of the Agreement that have made it difficult for some States to ratify the instrument, including the provisions of articles 7 and 21. They hope that the Conference will address those issues of concern, which undermine the effectiveness and universality of the Agreement.[157]

VII. Conclusions

328. Information obtained for the present report indicates that while most of the straddling fish stocks are generally well studied, knowledge about some of them and many highly migratory fish stocks is uncertain. For discrete high seas fish stocks and associated species information is very limited. In consequence, more scientific research is needed to ascertain the status of those stocks to provide a solid basis for the adoption of conservation and management measures. Information provided by States and RFMOs indicates that substantive work has been undertaken in order to implement the Agreement. However, it is an ongoing process and much remains to be done.

Notes

[1] *International Fisheries Instruments with Index* (United Nations publication, Sales No. E.98.V.11).

[2] In the present report, non-parties to the Agreement are indicated with an asterisk.

[3] Of particular importance was the study entitled "The Global Overview of Straddling and Highly Migratory Fish Stocks" by Evelyne Meltzer (later published in issue 20 of International Journal of Marine and Coastal Law, 577, 2005) and the contribution by Terje Lobach, a consultant, involved in the preparation of the present report.

[4] FAO Fisheries Technical Paper 337, World review of highly migratory species and straddling stocks, Rome.

[5] FAO Fisheries Technical Paper 457, Review of the state of world marine fishery resources, Rome, 2005.

[6] For information on RFMOs, including their websites, see http://www.fao.org/fi/body/rfb/index.htm.

[7] FAO Yearbook. Fishery statistics — Capture production 2003. Vol. 96/1. Rome, FAO (2005), see http://www.fao.org/fi/statist/FISOFT/FISHPLUS.asp.

[8] FAO 2003. Strategy for Improving the Information on the Status and Trends of Capture Fisheries, see http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/006/Y4859T/Y4859T00.HTM.

[9] For more information about FIGIS see http://www.fao.org/figis/servlet/static?dom=root&xml=index.xml.

[10] FAO Fisheries Technical Paper 470, Discards in the world's marine fisheries. An update, Rome, 2005.

[11] The website for SIDP is http://www.fao.org/fi/SIDP.

[12] The website for FIGIS information fact sheets is http://www.fao.org/figis/servlet/static?dom=root&xml=speciesgroup/data/tunalike/species_search.xml.

[13] The website for Fishbase is http://www.fishbase.org.

[14] Second Meeting of the Technical Advisory Committee of the FAO Project Management of Tuna Fishing Capacity: Conservation and Socio-economics. Bayliff, W. H.; Leiva Moreno, J. I. de; Majkowski, J. (eds). Madrid, Spain, 15-18 March 2004. FAO Fisheries Proceedings, No. 2, Rome, 2005.

[15] Since the adoption of the Convention, bluefin tuna in the north Pacific has been identified as a different species, Pacific bluefin tuna (*Thunnus orientalis*), while bluefin in the Atlantic has been renamed Atlantic bluefin tuna (keeping the scientific name *Thunnus thynnus*).

[16] At present, *Euthynnus alletteratus* is called little tunny and *E. affinis* is called kawakawa.

[17] At present, *Auxis thazard* is referred to as frigate tuna and *A. rochei* as bullet tuna.

[18] At present, *Tetrapturus* are referred to as spearfishes.

[19] The family Lamnidae is listed in annex I to the Convention as Isurida, the name previously used.

[20] A preliminary evaluation of the status of shark species. FAO Fisheries Technical Paper 380. Rome, 1999. Available at http://www.fao.org/DOCREP/003/X2352E/X2352E00.htm.

[21] http://www.fao.org/figis/servlet/static?xml=CCRF_prog.xml&dom=org&xp_nav=2,3.

[22] FAO species catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Part 2. Carcharhiniformes. *FAO Fish Synop.* 1984.

[23] Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Volume 2. Bullhead, mackerel and carpet sharks (Heterodontiformes, Lamniformes and Orectolobiformes). *FAO Species Catalogue for Fishery Purposes* No. 1, Vol. 2. Rome, FAO, 2001.

[24] For example, SIDP.

[25] http://www.fao.org/figis/servlet/FiRefServlet?ds=species&fid=2801.

[26] http://www.iccat.int/Documents/SCRS/SCRS/2005/20ENG.pdf.

[27] http://www.ices.dk/committe/acfm/comwork/report/2005/oct/nea%20porbeagle.pdf.

[28] This section is adapted from FAO. Fisheries management. 1. Conservation and management of sharks. FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 1. Rome, FAO, 2000.

[29] The SIDP website, Fishbase and other FAO information resources were used as sources of information on the biological characteristics and geographical distribution of the species of other highly migratory species.

[30] The list contains three species and one subspecies belonging to one of the species cited. The species *Scomberesox saurus* has two subspecies: *S. saurus saurus* and *S. saurus scombroides*. It is assumed that *Scomberesox saurus* in annex I to the Convention is *Scomberesox saurus saurus*.

[31] http://www.nafo.ca/science/advice/nafo-stocks.html.

[32] http://www.ices.dk/advice/icesadvice.asp.

[33] FAO notes that "there is a general perception that Patagonian toothfish is in a very critical situation due to high non-reported catches in international waters".

[34] Information in this section is drawn/adapted from the chapter on Deepwater fisheries in the Review of the State of World Marine Resources (FAO Fisheries Technical Paper 457); Deep Sea 2003: An International Conference on Governance and Management of Deep-Sea Fisheries, (*FAO Fisheries Report* No. 772); advice and information from the Advisory Committee on Fisheries Management of ICES; and RFMOs.

[35] There is no rigorous definition of a deep water fishery, but in general, they range from depths of 500-2,500 m.

[36] For example, orange roughy, which do not mature until age 20 or older and can live more than 100 years.

[37] Reported primarily off South Africa, New Zealand and southern Australia.

[38] Expert Consultation on the Interactions between Sea Turtles and the Fisheries within an Ecosystem Context. Rome, 9-12 March 2004. *FAO Fisheries Report* No. 738. http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/y5477e/y5477e00.htm.

[39] Technical Consultation on Sea Turtles Conservation and Fisheries. Bangkok, 29 November-2 December 2004. *FAO Fisheries Report* No. 765. http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/y5887e/y5887e00.htm.

[40] See http://www.iattc.org/DolphinSafeENG.htm for the IATTC conservation programme and http://swfsc.nmfs.noaa.gov/PRD/ for the South-west Fisheries Science Center (United States National Marine Fisheries Service) research programme on dolphin conservation.

[41] Anderson, O. F. and M. R. Clark. 2003. Analysis of the by-catch in the fishery for orange roughy, *Hoplostethus atlanticus*, on the South Tasman Rise. Marine and Freshwater Research. 54: 643-652.

[42] Further information on the ecosystem effects of fishing can be found at the ICES website: http://www.ices.dk/pubs/crr/crr272/CRR272.pdf. The United States National Research Council has published a report on the effects of trawling on the seafloor: http://www.nap.edu/catalog/10323.html.

[43] CCAMLR has 24 members, of which 19 are parties to the Agreement (Argentina,* Australia, Belgium, Brazil, Chile,* the European Community, France, Germany, India, Italy, Japan,* Namibia, New Zealand, Norway, Poland,* the Republic of Korea,* the Russian Federation, South Africa, Spain, Sweden, Ukraine, the United Kingdom, the United States and Uruguay). Key species are Antarctic krill, Antarctic rock cod, Antarctic toothfish, crabs, mackerel icefish, Patagonian toothfish, sevenstar flying squid and sub-Antarctic lantern fish. The main gears used are bottom trawls, longlines, pots and squid jigs.

[44] CCSBT has five members, of which two are parties to the Agreement: Australia, Japan,* New Zealand, Taiwan Province of China* and the Republic of Korea.* The organization manages Southern bluefin tuna and the gears used are longlines and purse seines.

[45] IATTC has 15 members, of which 4 are parties to the Agreement: Costa Rica, Ecuador,* El Salvador,* France, Guatemala,* Japan,* Mexico,* Nicaragua,* Panama,* Peru,* Spain, the United States, Vanuatu* and Venezuela* (Bolivarian Republic of). The Commission manages albacore tuna, bigeye tuna, billfishes, bonito, marlin, Pacific bluefin tuna, sailfish, skipjack tuna, swordfish and yellowfin tuna. The main gears used are longlines, pole and line, purse seines and trolling. It should be noted that a new convention, which will manage the same species, popularly known as the "Antigua Convention", was open for signature until 31 December 2004 and it will enter into force 15 months after the deposit of the seventh instrument of ratification or accession of the parties to the 1949 Convention establishing IATTC. As of November 2005, 13 countries had signed the Antigua Convention and two had ratified it (Bolivia,* Colombia,* Costa Rica, Ecuador,* El Salvador,* the European Community, Guatemala,* Honduras,* Mexico,* Nicaragua,* Panama,* Peru,* the United States, Vanuatu* and Venezuela* (Bolivarian Republic of)).

[46] ICCAT has 41 members from 5 continents, of which 15 are parties to the Agreement: Algeria,* Angola,* Barbados, Belize, Brazil, Canada, Cape Verde,* China,* Côte d'Ivoire,* Croatia,* Equatorial Guinea,* the European Community, France, on behalf of St. Pierre and Miquelon, Gabon,* Ghana,* Guatemala,* Guinea,* Honduras,* Iceland, Japan,* the Libyan Arab Jamahiriya,* Mexico,* Morocco,* Namibia, Nicaragua,* Norway, Panama,* the Philippines,* the Republic of Korea,* the Russian Federation, Senegal, Sao Tome and Principe,* South Africa, Trinidad and Tobago,* Tunisia,* Turkey,* United Kingdom, for overseas territories, United States, Uruguay, Vanuatu* and Venezuela* (Bolivarian Republic of). It manages about 30 highly migratory fish stocks, including albacore tuna (north and south Atlantic, Mediterranean stocks), Atlantic bluefin tuna (east and west Atlantic stocks), bigeye tuna, blue marlin, blue shark, bonito, porbeagle, shortfin mako, skipjack tuna, swordfish (North and South Atlantic, Mediterranean), white marlin and yellowfin tuna. The major gears used are longlines and purse seines.

[47] IOTC has 23 members, of which 12 are parties to the Agreement: Australia, China,* the Comoros,* the European Community, Eritrea,* France, on behalf of its overseas territories, Guinea, India, Iran (Islamic Republic of), Japan,* Kenya, Madagascar,* Malaysia,* Mauritius, Oman,* Pakistan,* the Philippines,* the Republic of Korea,* Seychelles, Sri Lanka, the Sudan,*

Thailand,* the United Kingdom, on behalf of its overseas territories, and Vanuatu.* The key stocks managed by IOTC are albacore tuna, bigeye tuna, black marlin, bullet tuna, frigate tuna, Indo-Pacific blue marlin, Indo-Pacific king mackerel, Indo-Pacific sailfish, kawakawa, longtail tuna, narrow barred Spanish mackerel, skipjack tuna, striped marlin swordfish and yellowfin tuna. IOTC also manages southern bluefin tuna, but CCSBT has primary responsibility. The main gears used are longlines and purse seines.

[48] NAFO has 13 members, of which 9 are parties to the Agreement: Bulgaria,* Canada, Cuba,* Denmark, on behalf of Faroe Islands and Greenland, the European Community, France, on behalf of St. Pierre and Miquelon, Iceland, Japan,* Norway, the Republic of Korea,* the Russian Federation, Ukraine and the United States. The straddling stocks managed by NAFO are American plaice, capelin, cod, Greenland halibut, redfish skates, shrimp, squid, white hake, witch flounder and yellowtail flounder. The following discrete stocks are under management: American plaice, cod, redfish and shrimp. The major gears used are bottom and mid-water trawls, gill nets and longlines.

[49] NEAFC has seven members, of which five are parties to the Agreement: Denmark, on behalf of Faroe Islands and Greenland, European Community, Estonia,* Iceland, Norway, Poland* and the Russian Federation. The straddling stocks managed by NEAFC are Atlanto-Scandian (Norwegian spring-spawning) herring, blue whiting, mackerel, redfish (oceanic) and Rockall haddock. Several deep sea species are also regulated, but it is unclear whether those stocks, or some of them, are straddling or only occur on the high seas (alfonsinos, artic skate, Baird's smoothhead, birdbeak dogfish, black cardinal fish, black dogfish, black scabbardfish, blackmouth dogfish, blondnose six-gilled shark, blue hake, blue ling, bluemouth, common mora, conger eel, deep-water crab, eelpout, frilled shark, forkbeards, greater lanternshark, greater silver melt, Greenland halibut, Greenland shark, gulper shark, Iceland catshark, kitefin shark, knifetooth dogfish, large-eyed rabbit fish, leafscale gulper shark, ling, longnose velvet dogfish, mouse catshark, Norwegian skate, orange roughy, Portuguese dogfish, rabbit fish, red seabream, Risso's smoothhead, roundnose grenadier, roughhead grenadier, round skate, sailfin roughshark, silver roughy, silver scabbard fish, small redfish, spiny scorpionfish, straightnose grenadier, tusk, velvet belly and wreckfish). The main gears used are bottom and mid-water trawls, gill nets, longlines and purse seines.

[50] SEAFO has four members, of which three are parties to the Agreement: Angola,* European Community, Namibia and Norway. The stocks managed are alfonsino, armourhead, cardinal fish, deep water hake, horse mackerel, mackerel, octopus, orange roughy, red crab, sharks, squid and wreckfish. It is unclear if some of the stocks that occur in the SEAFO area are straddling stocks or discrete stocks. The main gears used are bottom trawls and purse seines.

[51] WCPFC has 16 members, of which 12 are parties to the Agreement: Australia, China,* Cook Islands, Micronesia (Federated States of), Fiji Islands, Kiribati, Marshall Islands, Nauru, New Zealand, Niue,* Papua New Guinea, the Republic of Korea,* Samoa, Solomon Islands, Tonga and Tuvalu.* The key stocks managed by WCPFC are albacore tuna, bigeye tuna, skipjack tuna and yellowfin tuna. The gears used are artisinal gears, longlines, pole and line, purse seines and trolls.

[52] The Donut Hole Convention has six members, of which two are parties to the Agreement: China,* Japan,* Poland,* the Republic of Korea,* the Russian Federation and the United States. It manages Alaska pollock. Gears used are mid-water trawls.

[53] GFCM has 24 members, of which 7 are parties to the Agreement: Albania,* Algeria,* Bulgaria,* Croatia,* Cyprus, Egypt,* European Community, France, Greece, Israel,* Italy, Japan,* Lebanon,* the Libyan Arab Jamahiriya,* Malta, Monaco, Morocco,* Romania,* Serbia and Montenegro,* Slovenia,* Spain, Syria,* Tunisia* and Turkey.* It manages east Atlantic bluefin tuna, swordfish and several transboundary stocks (hake, red mullet, striped mullet, blue and red shrimp, Norway lobster, anchovy, sardine and dolphinfish). Gears used are bottom trawls, dredges, purse seines, surface longlines, driftnets and artisanal gear.

[54] The Scientific Committee of CCAMLR provides the Commission with summaries of its discussions, including the rationale for findings and recommendations. It establishes permanent

working groups (including Fish Stock Assessment, Ecosystem Modelling and Management, and Incidental Mortality Associated with Fishing) and recommends research programmes, conservation and other measures to the Commission. The CCAMLR Ecosystem Monitoring Programme monitors key life-history parameters of selected dependent species.

[55] The Scientific Committee of CCSBT includes an Advisory Panel. Stock assessment is conducted by the Stock Assessment Group established to separate technical evaluation and advisory roles. The Advisory Panel was created to assist national scientists with stock assessment, to provide support to processes and to comment on papers submitted by national scientists. If members cannot agree on scientific advice, the Advisory Panel will prepare independent advice, which is considered by the Scientific Committee, followed by final advice to the Commission.

[56] IATTC has not established a particular scientific committee, but there is a Permanent Scientific Staff with offices in major fishing ports. For scientific inputs, three working groups provide advice on Stock Assessments, on By-catch and on Limit Reference Points. IATTC collaborates on stock assessment for bigeye tunas and billfish with SPC and with Chile and the European Community for swordfish pursuant to the South-east Pacific Swordfish Arrangement.

[57] ICCAT has a Standing Committee on Research and Statistics mandated to advise on conservation and management measures, to address specific ICCAT requests and to produce annual reports on stock status that serve as the scientific basis for ICCAT decisions. The Committee has two Subcommittees: the Subcommittee on Statistics and the Subcommittee on Ecosystems, as well as Species Groups and Working Groups. Furthermore, the Committee coordinates national research activities and develops plans for cooperative research programmes.

[58] The IOTC Scientific Committee reviews the work of several working parties (a meeting of scientists, in their individual capacity, who conduct stock assessment) and propose management recommendations, which is to be convened if necessary: the Working Party on Tropical Tunas, the Working Party on Tagging, the Working Party on Billfish, the Working Party on Temperate Tunas, the Working Party on Neritic Tunas, the Working Party on By-catch and the Working Party on Methods) and advises the Commission on research, data collection, status of stocks and management issues. It examines management options and recommends to the Commission appropriate management measures for particular stocks.

[59] The Scientific Council of NAFO, which has four standing committees (Fisheries Science, Publications, Research Coordination and Fisheries Environment), acts upon requests from the Fisheries Commission and coastal States for advice on stock assessments. The work of the Scientific Council forms the foundation upon which the Fisheries Commission determines management measures for areas beyond the national jurisdiction of contracting parties.

[60] Yellowtail flounder in division 3LNO and shrimp in division 3M.

[61] NEAFC receives advice from ICES concerning all stocks under its purview in the Convention area, pursuant to article 14 of the NEAFC Convention. The cooperative arrangement with ICES was formalized under a memorandum of understanding in 1999.

[62] Blue whiting, mackerel and Norwegian spring-spawning (Atlanto-Scandian) herring.

[63] SEAFO Convention, article 7, and WCPFC Convention, articles 5c and 6.

[64] The inaugural meeting of the SEAFO Scientific Committee was held in late September 2005. The Committee provides the Commission with scientific advice and recommendations for the formulation of conservation and management measures for fishery resources covered by the Convention. The WCPFC Scientific Committee met for the first time in mid-August 2005. Several working groups (on Technology, on Methods, on Statistics, on Biology, on Stock Assessment and on Ecosystem & By-catch) met, providing recommendations to the Commission concerning research planning and coordination, data and modelling priorities for 2006 and the development of a medium research plan.

[63] Precautionary reference points used are *Bpa* (biomass threshold below which precautionary action should be taken) and *Fpa* (fishing mortality threshold above which management action should be taken).

[64] So far, four Atlantic cod stocks, pollock on Georges Bank, Atlantic herring, Atlantic salmon, harp seals, four stocks of Beluga whales, Pacific cod, sablefish and Pacific herring.

[65] Protocol from the thirty-first session of the Joint Norwegian-Russian Fisheries Commission.

[66] Denmark has transferred the legislative and administrative competence concerning fisheries to the Faroe Islands Home Rule Authorities.

[67] For 2000 and subsequent years, the parties have agreed to restrict their fishing on the basis of a total allowable catch consistent with a fishing mortality in the range of 0.15-0.20 for appropriate age groups as defined by ICES. Should the spawning stock biomass fall below *Bpa*, this fishing mortality rate shall be adapted in the light of scientific estimates of the conditions then prevailing.

For 2006 and subsequent years, they will fish on the basis of a total allowable catch consistent with a fishing mortality less than 0.32 for appropriate age groups as defined by ICES. Should the spawning stock biomass fall below *Bpa*, this mortality rate shall de adapted in the light of scientific estimates of conditions then prevailing.

[71] For 2001 and subsequent years, the parties have agreed to restrict their fishing on the basis of a total allowable catch consistent with a fishing mortality rate of less than 0.125 for appropriate age groups as defined by ICES. Should the spawning stock biomass fall below *Bpa*, this mortality rate shall be adapted in the light of scientific estimates on the basis of at least a linear reduction in the fishing mortality rate from 0.125 at *Bpa*, to 0.05 at *Blim*.

[72] FAO Fisheries Technical Paper 313, op. cit., p. 6.

[73] Report of the Fourth Meeting of Regional Fishery Bodies, op. cit.

[74] Only purse-seine vessels that have fished in the east Pacific Ocean before 28 June 2002 are included.

[75] IOTC resolution 03/01 on the limitation of fishing capacity of contracting parties and cooperating non-contracting parties.

[76] Article 13 (4) of the NAFO Conservation and Enforcement Measures and article 3, subparagraph (d), of the NEAFC Scheme of Control and Enforcement.

[77] Council regulation (EC) No. 2792/1999 of 17 December 1999. Council regulation (EC) No. 2371/2002 of 20 December 2002.

[78] When two quotas are merged under this system, the vessel will be allowed to fish this "double" quota for 13 years if the "donor" vessel is removed from Norwegian fisheries and 18 years if that vessel is scrapped.

[79] Integrated Fisheries Management Plans, which contain commitments to the long-term objective of developing large-scale and local integrated management plans for all of Canada's oceans, starting with priority areas and building on experience as resources and capacity permit.

[80] FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2 (Fisheries management: the ecosystem approach to fisheries). Rome, 2003.

[81] Resolutions C-04-09 and C-05-02 provide conservation measures for tunas; resolutions C-04-05, C-04-07 and C-05-03 provide measures for by-catches.

[82] The European Community, Morocco,* New Zealand and the United States.

[83] CCAMLR Conservation Measure 25-02 (2003) and Conservation Measure 25-03 (2003).

[84] IATTC resolution C-04-05.

[85] ICCAT resolutions 03-14 and 96-15.

[86] IOTC resolution 05/05.

[87] IOTC recommendations 05/08 and 05/09.

[88] Articles 9-12 of the NAFO Conservation and Enforcement Measures.

[89] The European Community Action Plan on Discards (COM (2002) 656 final) and Council Regulation (EC) No. 2792/1999 of 17 December 1999.

[90] CCAMLR Conservation Measure 25-01 (1996).

[91] The method involves pulling a person on a board behind a boat.

[92] Croatia,* the 25 States members of the European Community are parties to MARPOL 73/78 and its annex, Morocco,* New Zealand, Pakistan,* Saudi Arabia,* the United Kingdom, the United States and Venezuela* (Bolivarian Republic of).

[93] Cyprus Fisheries Regulations, the European Community (Council Regulation No. 1626/94 of 27 June 1994), Norway (1983 Seawater Fisheries Act, section 4).

[94] Belgium, Canada, Denmark, Estonia,* Finland, France, Germany, Iceland, Ireland, Latvia,* the Netherlands, Norway, Poland,* Portugal, the Russian Federation, Spain, Sweden, the United Kingdom and the United States. There are also a number of States that have affiliate status with ICES: Australia, Chile,* Greece, New Zealand, Peru* and South Africa.

[95] Canada, China,* Japan,* the Republic of Korea,* the Russian Federation and the United States.

[96] The fact sheet is based upon a summary stock status report that CCSBT issued in 2004 for other RFMOs with an interest in southern bluefin tuna. This will be updated annually.

[97] Task I: annual catch by gear, region and flag; Task II: catch and effort statistics for each species by small area.

[98] ICCAT resolutions 16-01 and 66-01.

[99] The Benguela Environment Fisheries Training Interaction Programme and the Benguela Current Large Marine Ecosystem.

[100] The format includes category, data element, field code, type, content and definitions. More information can be found at http://www.neafc.org/measures/docs/Scheme-2005.

[101] CCAMLR (1980), CCSBT (1993), IATTC (1949), ICCAT (1966), IOTC (1993), NAFO (1978), NEAFC (1980).

[102] Final adoption will take place when two contracting parties have finalized internal procedures. The parties have agreed to apply the amendments provisionally until ratification procedures have been concluded.

[103] IATTC resolution C-04-06.

[104] ICCAT resolution 03-14.

[105] IOTC resolution 02/02.

[106] Article 21 of the NAFO Conservation and Management Measures.

[107] Article 9 of the NEAFC Control and Enforcement Scheme.

[108] SEAFO Conservation Measure 01/05.

[109] Article 24 (8) of the WCPFC Convention.

[110] Annex I to the CCAMLR Scheme of International Scientific Observation.

[111] IATTC resolution C-04-03.

[112] Article 23 of the NAFO Conservation and Management Measures (amended in 2003).

[113] Article 16 of the SEAFO Convention and article 28 of the WCPFC Convention.

[114] Articles 24-37 of the NAFO Conservation and Management Measures.

[115] Articles 13-25 of the NEAFC Scheme of Control and Enforcement.

[116] Article 16 of the SEAFO Convention and articles 25-27 of the WCPFC Convention.

[117] If a dispute goes to arbitration, the Tribunal must be constituted, as provided for in the annex to the Convention.

[118] If one or more of the contracting parties object, the matter will be put to a vote by written procedure. A positive outcome for the applicant requires support by the majority.

[119] Article 8 of the SEAFO Convention and article 21 of the WCPFC Convention.

[120] Estonia,* Latvia,* Lithuania* and Poland* have withdrawn.

[121] Iceland, the Republic of Korea,* South Africa, the United Kingdom (on behalf of St. Helena and its dependencies of Tristan da Cuhna and Ascension Island) and the United States.

[122] Article 8, paragraph 4, of the CCSBT Convention.

[123] IATTC resolution C-02-03.

[124] IATTC resolution C-04-09.

[125] ICCAT resolution 01-25.

[126] IOTC Working Party on Management Options.

[127] CCAMLR Conservation Measure 10-07 (2003).

[128] IATTC resolution C-05-07, IOTC resolution 02/04, ICCAT recommendation 02-23, chapter VI of the NAFO Conservation and Enforcement Measures, NEAFC Scheme to Promote Compliance by Non-contracting Party Vessels with Recommendations established by NEAFC.

[129] See the following: www.ccamlr.org/pu/E/sc/fish-monit/iuu-vessel-list.htm, www.iccat.es.iuu.htm, www.iotc.org/English/iuu/search.php, www.neafc.org/measures/iuu_b.htm.

[130] ICCAT recommendation 02-22 (entered into force 3 June 2003).

[131] CCSBT10 resolution (2003), IATTC resolution C-03-07 and IOTC resolution 02/06.

[132] CCAMLR resolution 19/XXI.

[133] CCAMLR Conservation Measure 10-05.

[134] CCSBT resolution adopted 19-22 October 2004.

[135] IATTC resolution C-05-04 (adopted 20-24 June 2005).

[136] CCAMLR resolution 24/XXIV.

[137] For example article 3 (2) and article 10 (1) (d) of the NEAFC Scheme on Control and Enforcement.

[138] Council regulation No. 2847/1993 of 12 October 1993, as amended, and related subsidiary texts: Council regulation (EC) No. 2791/1999 of 16 December 1999 (NEAFC — amended), Council regulation (EC) No. 1936/2001 (ICCAT, IOTC, IATTC), Council regulation (EC) No. 601/2004 of 22 March 2004 (CCAMLR).

[139] CCAMLR Conservation Measure 10-03 (2002).

[140] ICCAT recommendation 97-10.

[141] ICCAT recommendation 98-11.

[142] IOTC resolution 02/01, amended by resolution 05/03.

[143] Norwegian regulation of 6 August 1993, amended 29 June 1999.

[144] Articles XI-XIV of the CCAMLR System of Inspection, articles 33-36 of the NAFO Conservation and Enforcement Measures and articles 21-24 of the NEAFC Scheme on Control and Enforcement.

[145] Council regulation 2371/2002, art. 23.2, Council regulation 3317/94, art. 1.2, Council regulation 3690/93, art. 1.2, Council regulation 1447/99.

[146] Lacey Act amendments of 1981.

[147] IOTC resolutions 99/01, 03/01, 05/01, 05/05, 05/08, 05/09.

[148] SEAFO Convention, article 21, and WCPFC Convention, article 30, respectively.

[149] The Agreement, article 3.

[150] Declarations upon ratification of the Convention by Argentina* and Chile,* DOALOS *Law of the Sea Bulletin*, Nos. 30 (1996) and 35 (1997).

[151] Working Paper submitted by the delegations of Chile,* Colombia,* Ecuador* and Peru,* "Elements of International Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks on the High Seas", 16 July 1993 (A/CONF.164/L.11), *United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks: Selected Documents*, Martinus Nijhoff, p. 197.

[152] Statement of Chile in ICSP-4, report on DOALOS website; and communication by Mexico* on "Impediments that prevent Mexico from becoming a party to the 1995 Agreement", dated 5 October 2005.

[153] List of issues submitted by the delegation of Japan,* Organization of work, 8 June 1993 (A/CONF.164/L.6), *United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks*, op. cit., p. 130.

[154] List of issues submitted by the delegation of the Republic of Korea,* Organization of work, 10 June 1993 (A/CONF.164/L.7), ibid., p. 133.

[155] "Comments on compatibility and coherence between national and international conservation measures for the same stocks", submitted by the delegation of Japan (A/CONF.164/L.28), 27 July 1993, ibid., p. 245.

[156] Communication from the Republic of Korea* on "Impediments that prevent the Republic of Korea from becoming a party to the Agreement", dated 12 September 2005.

[157] Reports of ICSP-1, para. 13; and ICSP-3, para. 49. See report on DOALOS website.